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A New Year's Message From the President

TO THE MEDICAL MEN AND WOMEN OF CANADA

TO each of you I extend a heartfelt wish that in the individual tasks which you essay throughout the year you will meet with success and with the happiness which comes from the consciousness of work well done. It would be idle to wish for you easy tasks. May I, rather, wish for you difficult problems and the strength and skill to solve them successfully.

The Canadian Medical Association exists for the purpose of aiding you in each of these. By cooperative effort we can ensure that a larger measure of success will result from the initiative of the individual. In the past, cooperative effort along many lines has been undertaken. Space permits of reference to only a few: studies of the cause and prevention of maternal mortality; the protection of the public from dishonest vendors of proprietary nostrums; improvement of undergraduate medical education; Dominion-wide post-graduate instruction; health education of the lay public; improvement of, and assistance to, hospitals through our Department of Hospital Service.

This year has problems peculiarly its own. Council has authorized the establishment of a Department of Cancer Control. The organization of this department has been entrusted to a committee. The fact that the Chairman of that committee is Dr. Alexander Primrose is a guarantee that the work will be thoroughly and painstakingly done. May I bespeak for him the earnest cooperation of every doctor in Canada in his difficult and important task.

The question of the development of the National Department of Health into a real, vital force is one which demands our careful attention. When the time comes we should be ready with constructive suggestions for the reconstruction of that Department.

A committee is at work endeavouring to devise a method of clearly defining the qualifications to be demanded of those who enter the various specialties. This is a work which deserves the active assistance of every Canadian doctor.

To-day in five of the Provinces of Canada social legislation is pending which threatens to change completely the economic relations between the medical profession and the public; in another, state medicine in its most repugnant form is already entrenched. Ladies and Gentlemen, "Wake up,"! The report of our Committee on Economics contains all that is available in regard to Health Insurance. Please study it and form your own opinions. Discuss it in your local societies and pass on your conclusions to your Provincial Executive. You can do that only if you yourselves are well informed about the question.

Many doctors are still outside of our Association. We need them. They need us. It is your job and mine to persuade them to become active members.

Finally, if our cooperative efforts are to succeed, we must have efficient machinery to ensure that end. The methods under which we are operating are cumbersome and obsolete. In the past few months some fifteen hundred of the leaders of the medical profession have given support to the principle of having one National Medical Association with a Branch in each province. They have demanded that a Constitution and By-laws be prepared which will ensure uniformity of practice in the work of organization in each province of Canada. It is your task and mine to aid in working out the details of a plan which will put into effect the principle involved in this re-organization of the Canadian Medical Association.

May this year bring to each of you abounding health, success in your work, and a greater measure of material prosperity!

J. S. McEACHERN.

INFECTIONS IN THE NEW-BORN

(A CLINICAL AND ANATOMICAL ANALYSIS, WITH SPECIAL REFERENCE TO PNEUMONIA)*

BY W. H. CHASE,

Montreal

IT is apparently true that the number of unexplained deaths in the new-born becomes progressively smaller as more careful post-mortem examinations are performed and their technique improved. A few years ago the frequency and relative importance of intra-cranial birth-trauma were more fully appreciated by the general adoption of the modified Beneke technique for opening the skull. Similarly, at this Institute, the more extensive routine histological examination of all organs has done much in recent years to emphasize the frequency and importance of infections in the new-born. As one approaches the care and precision in the examination of these babies which is routine in the adult, the number of deaths which are vaguely attributed to prematurity, toxæmia, or to unexplained asphyxia, rapidly diminishes.

In reviewing the autopsies on all babies up to one month of age during the past five years, we have been impressed by the frequency of a cell exudate in tissues of a character that, in conjunction with the history, must be attributed to some kind of bacterial or other outside irritant. In 445 cases during this period gross or microscopic evidence of infection was found in 119 instances, a frequency of 26 per cent. This was only surpassed by the frequency of one other group of anatomical lesions, namely, intra-cranial trauma, in which there were 135 cases (32 per cent). Many of these, however, were apparently of lesser consequence. It is the purpose of this report to analyze these infections, not bacteriologically, because the organisms in most instances were not cultured, but, anatomically, with an attempt to correlate clinical symptoms, so that perhaps more of these cases may be suspected during life and therefore treated more intelligently during the precarious post-natal period.

The following Table gives the more common distribution of inflammatory foci in these 119 cases.

Exudative and purulent			pneumonia	97	27
"	"	"	otitis media	38	
"	"	"	meningitis	8	
"	"	"	lesions at the umbilicus	6	
"	"	"	miscellaneous foci	8	

It is obvious that pneumonia is by far the most frequent anatomical lesion, so that an analytical study of this infection and its associated lesions includes a very large proportion of all infections in the new-born. A classification of pneumonia at this age-period is most satisfactorily based on the probable primary focus. We have therefore adopted a modification of that employed about twenty years ago by Hess Thaysen,[6] as follows:—

	Cases
I. *Metastatic Infections.*	
(a) Intra-uterine: from the mother through the placenta	9
(b) Extra-uterine: from a primary focus such as the navel or intestine	8
II. *Aspiration Infections, intra- or extra-uterine.*	
(a) Products of conception	17
(b) Food or nasopharyngeal material	21
III. *Bronchial or Peribronchial Infections, without discoverable extra-respiratory focus; extra-uterine*	42
	97

I. METASTATIC INFECTIONS

(*a*) *Intra-uterine: from the mother through the placenta.*—There seems to be no doubt that bacterial invasion of the fetus may occur *in utero*. Holt[7] is of the opinion that the mother may transmit to her baby almost any kind of infectious disease, but the mode of transmission of the virus or organism to the fetus during intra-uterine life is still disputed. It is generally assumed that it is through the placenta and the absence of cell exudate in some instances does not rule out the possibility of bacteria having been transmitted to the fetus through its vessels. The metastatic pneumonias

* Presented in Abstract at the Annual Meeting of the Pædiatric Section of the Montreal Medico-Chirurgical Society, April 13, 1934.

From the Pathological Institute, McGill University, Montreal, Professor Horst Oertel, Director.

include most of those cases which are clinically referred to as "sepsis in the new-born". This term is usually (though incorrectly) limited to the more or less general invasion of the human organism by the pyogenic, or pus-producing, bacteria. It is more widely applied here to cover all diseases caused by microörganisms which result in other than localized symptoms. It therefore includes 12 cases of congenital syphilis, (8 of which had pneumonia), and one probable case of transmitted pneumococcal infection.

Syphilis is a most important cause of post-natal death. As in the adult, it is characterized by a variable clinical and anatomical picture. The following points were of assistance in making the diagnosis:—

1. *History or clinical evidence of syphilis in the mother and baby.*—The obstetrical history is well recognized as one of repeated miscarriages, abortions, still-births and neonatal deaths. Thus Jeans[8] estimates that the death rate in America for the syphilitic infant is just double that of the non-syphilitic infant under the same economic conditions. In this small group of 12 cases, 5 were multiparæ, but there happens to be only one history of miscarriage. Eight infants were premature, as indicated by a length of less than 48 cm., and the average duration of life was only 3 days.

The clinical history of syphilis in the mother is usually very indefinite, often due to the apparent unimportance of the symptoms and often to the long interval between the time of infection and the pregnancy. In only one instance in this series did the mother give a suspicious history of a skin rash for which she was not treated five years before the death of her second baby. There is no doubt that many cases of syphilis in women go unrecognized till an autopsy is done on a new-born. In 3 instances the infection was not suspected in the mother until the autopsy was done on the baby. The diagnosis was then confirmed by a strongly positive maternal serum Wassermann reaction, although careful questioning failed to disclose a history of symptoms referable to the disease. This merely emphasizes the importance of a careful history and a serological examination in doubtful cases.

2. *A positive serum Wassermann reaction in the mother.*—Unless the baby shows clinical or anatomical evidences of syphilis this is no more than a diagnostic aid. Although the reaction was strongly positive in the mother in all these cases, there were two new-born deaths in which the maternal blood serum was strongly positive which are not included in this series because no anatomical evidence of syphilis could be found at autopsy. It is unfortunate that a cord serum Wassermann reaction was not taken, but in any case the *anatomical evidence* for or against inherited syphilis must be considered of more diagnostic value than the mother's specific serological reaction.

3. *Syphilitic changes in the placenta.*—These were of very little diagnostic aid in this series. In 6 instances the placenta was not examined, and in the other 6 cases the characteristic periarteritis, endarteritis, and scattered large non-vascular villi were indefinite or absent. This small series therefore substantiates Browne's[1] statement that "while microscopic examination of the placenta may be of greatest assistance, yet borderline cases are not infrequently met with in which a dogmatic pronouncement is impossible."

4. *Anatomical findings.* — Gross lesions as well as clinical symptoms of syphilis in the new-born are often not specific, perhaps due to the very short post-natal life. The external examination and gross appearance of the organs were usually quite unreliable as a diagnostic aid in this series. In only two instances, a maculo-papular eruption was localized to the plantar surface of the feet. The presence of the morphologically specific spirochæta in tissues is, of course, the only absolutely diagnostic evidence of syphilis. Although Levaditi's silver impregnation stain was resorted to in many tissues, the organisms were only definitely found in 3 instances; 2 cases were doubtful, and the other 7 were negative. This was often attributed to the more or less extensive post-mortem autolysis. All 12 cases, however, showed a diffuse interstitial proliferative reaction with some leucocytic exudate in several parenchymatous organs. In the absence of the organism this was accepted as the most important anatomical evidence of congenital syphilis. The pancreas, liver and spleen were most frequently involved, then the adrenals, lungs and thymus. The osteochondrosis which is so frequently described in older infants was only found in one instance (and then

not grossly obvious) in routine sections through the lower end of the femur.

Interesting is the fact that the typical "pneumonia alba" of Virchow, which is often reported in cases of syphilis in the still-born, was absent, although 4 of our cases died within an hour of birth. The lung lesion consisted of a variable interstitial connective-tissue hyperplasia most marked about blood vessels (Fig. 1). In more than half the cases this was complicated by patchy masses of amniotic fluid constituents filling the bronchi and extending into some alveolar spaces, while collections of pus and leucocytes completed the picture of a typical aspiration pneumonia. This is the immediate cause of death in the majority of new-born syphilitics. There seems no doubt that the syphilitic pneumonia must be present, and even well advanced, before birth in a number of instances. The altered tissue conditions may produce the birth asphyxia which is so frequently followed by a rapidly progressive aspiration infection.

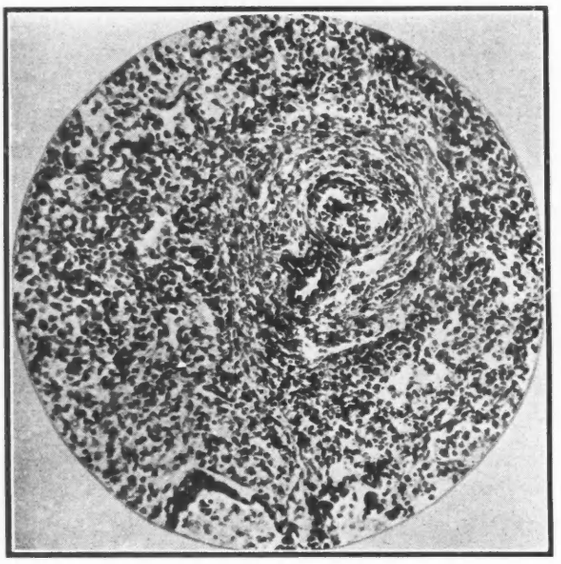

FIG. 1.—Congenital syphilitic pneumonia. Note the diffuse interstitial fibroblastic proliferation and marked periarterial thickening.

Particular mention must be made of a probable case of transmitted intra-uterine pneumococcal septicæmia in a five-days old male infant. The organism was cultured from the purulent exudate in the meninges and left middle ear, and was found in the histological sections of the lungs, where there was a purulent patchy pneumonia. Pneumococci were cultured from the mother's blood the day before she died, the infant then being two days old.* The autopsy showed a diffuse lobar pneumonia and generalized septicæmia. The same organism was cultured from the placental site of the uterus, but no bacteria or cell exudate could be seen in the placenta and cord.

Although this case is not a proved instance of placental transmission, because the pneumococcus was not isolated from the placenta and umbilical cord, yet the collected evidence is very suggestive. The organism in both mother and infant was cultured at the placental site, and there was a hæmatogenous distribution of the infection with no other primary focus during the five days of post-natal life. Gordon and Lederer[3] report an authentic case of pneumococcal intra-uterine infection in which practically all the tissues of the fetus, including the bone-marrow, were very heavily infected with the organism, but cell exudate was confined to the lungs and pleura. Similarly, the absence of cell exudate in the placenta and cord in our case does not necessarily mean that pneumococci have not been carried through its vessels to infect the fetus.

(*b*) *Extra-uterine: from some localized primary focus.*—The frequency of this group of sepsis is assumed to be due to the apparently low resistance which the new-born offer to pyogenic organisms. Von Reuss[10] suggests that this in turn is due to a deficiency in bacteriolysis which plays some part in the development of the septic process. Thus he refers to the researches of Klimoff, showing that when pure cultures of streptococci are treated with umbilical cord serum only a short cessation of growth is noticeable, in contrast to other bacteria that were killed when similarly treated. The cause for this susceptibility of the new-born to pyogenic infections is, however, a bacteriological problem which is still obscure.

The relative infrequency of extra-uterine septicæmia in recent years is a tribute to the aseptic treatment of the confinement, both in the hospital and in the home. Less frequently employed mechanical methods of delivery, which so often produce surface abrasions that are potential foci of a generalized infection, may also be concerned. There were only 6 cases of pneumonia (in this series of 97 cases)

* The bacteriological examinations were kindly made for us by Professor Murray's department.

in which an exudative or purulent lesion of the umbilicus was a definite primary focus. In two instances there was a diffuse ulcerative colitis and enteritis which apparently represented a food infection. Both these children were delivered in unsanitary homes and were not breast fed.

The variety of exudative purulent lesions which may be encountered in the same baby, as compared with septicæmia in the adult, may perhaps be a further evidence of the greater susceptibility of the infant host. In this small group of 8 cases the pneumonia was associated with an exudative purulent peritonitis in 2 instances, with exudative cholangitis in 4, exudative purulent pleuritis in 3, and exudative purulent meningitis in 2. Although purulent otitis media is the commonest associated pyogenic lesion in all pneumonias it was not found in any of these definitely metastatic lung infections.

The appearance of the lungs in these cases is quite characteristic. They are mottled red, distended, and, if not uniformly solid, contain firm nodules. This is due to focal masses of leucocytes, fibrin and pus, surrounded by red cells. These have no relation to the bronchi. In the later stages metastatic pyæmic abscesses form, in which masses of bacteria are usually found.

As in syphilis of the new-born, except for the presence of the primary focus, the clinical picture is most indefinite. We have found jaundice mentioned most constantly, but the time of its appearance is so variable and it is so frequent anyway during the first ten days of life that it would seem to be of little help in making an early diagnosis. In contrast to the intrauterine metastatic infections (congenital syphilitic group), there were only 2 premature infants instead of 8, and the average duration of life was 14 instead of 3 days.

II. Aspiration Infections

(*a*) *Products of conception.*—This group includes those cases which histologically showed large quantities of amniotic fluid constituents in the bronchi and alveoli associated with a variable cell exudate. Johnson and Meyer[9] point out that the fetus *in utero* is submerged in amniotic fluid, which enters the nose, mouth and pharynx. It is uncertain whether any reaches the trachea and bronchi. Helwig[4] thinks that this is impossible, because the glottis is closed. But certainly little or none can normally reach the collapsed alveoli.

The presence of large amounts of amniotic fluid constituents in the lungs is definite evidence of intra-uterine asphyxia. It is produced by the initiation of premature respiratory movements *in utero*. This material is sucked into the smaller air passages during the first inspirations. Asphyxia is therefore a consequence of the premature interruption of the placental circulation. This in turn is due to a great variety of direct and indirect causes (see Helwig). In this series, it is not surprising, therefore, that 12 infants were premature out of a total of 17 which had variable amounts of amniotic fluid constituents in their lungs.

Hess Thaysen[6] and others state that all deaths from pneumonia occuring during the first three days are the result of ante-natal infections, but we are inclined to believe that many intra-uterine aspiration infections survive a longer period. The average duration of life in these 17 cases was 6 days. The depth to which amniotic fluid may be drawn into the air passages depends on two variable factors, *viz.*, the viscosity of the fluid and the force of the aspiration. These factors largely determine the extent and distribution of the infection, and must also influence its duration. There is included in this group, for example, a Cæsarean section delivery at term in which turbid amniotic fluid contained a *Staph. aureus*, although the infant lived for 11 days and had the typical anatomical picture of an aspiration pneumonia.

It is not uncommon to find amniotic fluid constituents in the lungs without a cell exudate, and we have never found any evidence of phagocytosis of the disintegrating epidermal cells. They seem to be slowly autolyzed and disappear about the fifth day of post-natal life. A cell exudate was almost always associated with the presence of organisms in the lungs. It is most probable, therefore, that bacterial infection of amniotic fluid is a pre-requisite to the pneumonia.

When does the infection of aspirated amniotic fluid usually occur? An analysis of these 17 cases shows that in only 3 instances was the fluid turbid and foul-smelling, that is, grossly infected. In 3 other cases there was a long dry labour, the time from the rupture of

the membranes to delivery being about 50 hours. In the majority of instances, however, the baby had a perfectly normal delivery and there was likewise a normal puerperium. This suggests that the respiratory infection usually occurs in the birth canal rather than in the uterus. Although it is generally true that the longer the duration of labour, the greater are the chances of an aspiration infection, this large group of normal labours of short or moderate duration indicates that asphyxia, from whatever cause, is an important predisposing factor to the infection as well as the aspiration of amniotic fluid. Treatment should therefore be directed toward a rapid delivery and immediate removal of fluid from the upper respiratory tract at birth without undue trauma.

In 4 cases special reference was made to the very abundant clear amniotic fluid in which the average duration of the second stage of labour was between six and seven hours. It is probable that the interference of hydramnios in physiological labour predisposes to an aspiration pneumonia by prolonging the second stage.

There is nothing to indicate that mechanical interferences or spontaneous breech presentations are related to this type of pneumonia. In only 3 cases low- or mid-forceps were applied, and in one there was a bag induction. There was only one breech delivery. In reviewing other cases, it is significant that an aspiration pneumonia was nearly always confined to those in which the indication for the application of forceps was a prolonged labour with intrauterine asphyxia. The absence of pneumonia in other mechanical deliveries indicates that the infection is an anatomical manifestation and is not related to the mechanical interference.

The recognition of amniotic fluid in histological sections is not easy, because it consists mostly of water with only small quantities of albumin, and therefore simulates blood serum and plasma. The usual constituents of this fluid are, however, much more readily recognized, particularly the cornified desquamating epidermis and vernix caseosa. Large masses of epithelium were accepted as evidence of the aspiration of amniotic fluid in our cases. (Figs. 2 and 3). Vernix caseosa is readily identified by doing fat stains on frozen sections. Farber and Sweet[2] also illustrate the vernix membrane clearly with Mallory's aniline blue stain. Lanugo hairs cannot be well differentiated with hæmatoxylin and eosin stains. Meconium is recognized as brownish yellow, dense, globular masses. It is, of course, not a normal constituent of amniotic fluid, but was seen in 3 of the cases of intrauterine asphyxia in which over twenty-four hours had elapsed from the time of rupture of the membranes till delivery.

(*b*) *Aspiration infection: food and nasopharyngeal material.* — Separate grouping of intra- and extra-uterine aspiration pneumonias is often impossible because many cases show anatomical evidences of both. The outstanding feature of these cases is the presence of curd and mucus filling the trachea, bronchi, and often the alveoli. If these structures are carefully opened *in situ* the white or yellow curd may be seen in the lumen and escaping from smaller bronchi on the cut surface of the lungs. There is usually emphysema at the apices and anterior margins, while the lower lobes are distended, dark red and solid.

In microscopic sections the milk appears as pale blue or yellow amorphous material, almost invariably mixed with masses of bacteria. The cell exudate varies from a purulent bronchitis, usually with emphysema in the upper lobe (Fig. 4), to a confluent purulent bronchopneumonia usually in the lower lobes. There seems to be a marked tendency for this exudate to invade atelectatic portions, and Hess[5] points out that the richness of these parts in blood and tissue fluids may make a most favourable medium for the multiplication of invading organisms.

Clinically, these were nearly always feeble infants from mothers having a history of some cardiovascular disease, nephritis, toxæmia or eclampsia. They were often unable to nurse from the breast. It is assumed, because of imperfectly developed pharyngeal reflexes, that they cannot swallow properly, so that some of the bacteria-laden milk and vomitus runs into the trachea and is aspirated into the bronchi, carrying with it organisms from the mouth and throat. In this series of 20 cases, 15 were premature, and the average duration of life was 15 days, or, as one might expect, over twice as long as the aspirated amniotic fluid infections.

Except for the loss of weight, the clinical symptoms were most variable. With the difficulty in swallowing most frequently mentioned

were attacks of cyanosis and a slight nasal discharge. The temperature varied from subnormal to marked elevation. Often slightly rapid breathing was the only respiratory symptom, and it did not appear till a day or two before death. Restlessness and twitching of extremities was mentioned in 6 infants who lived at least three weeks.

This group included two babies with œsophageal atresia. Both died in the second week, which was probably too late to allow identification of aspirated amniotic fluid in the lungs. Material could only reach the stomach through the fistula into the trachea.

There were 8 instances of a purulent otitis media in this series of 21 cases of extra-uterine aspiration pneumonia, while none were found in the intra-uterine aspiration group. The average duration of life in these 8 cases was 18 days. The frequency of otitis media in this group may be due to differences in the reaction of the host to the infection, and also to the difference in organisms infecting milk and amniotic fluid.

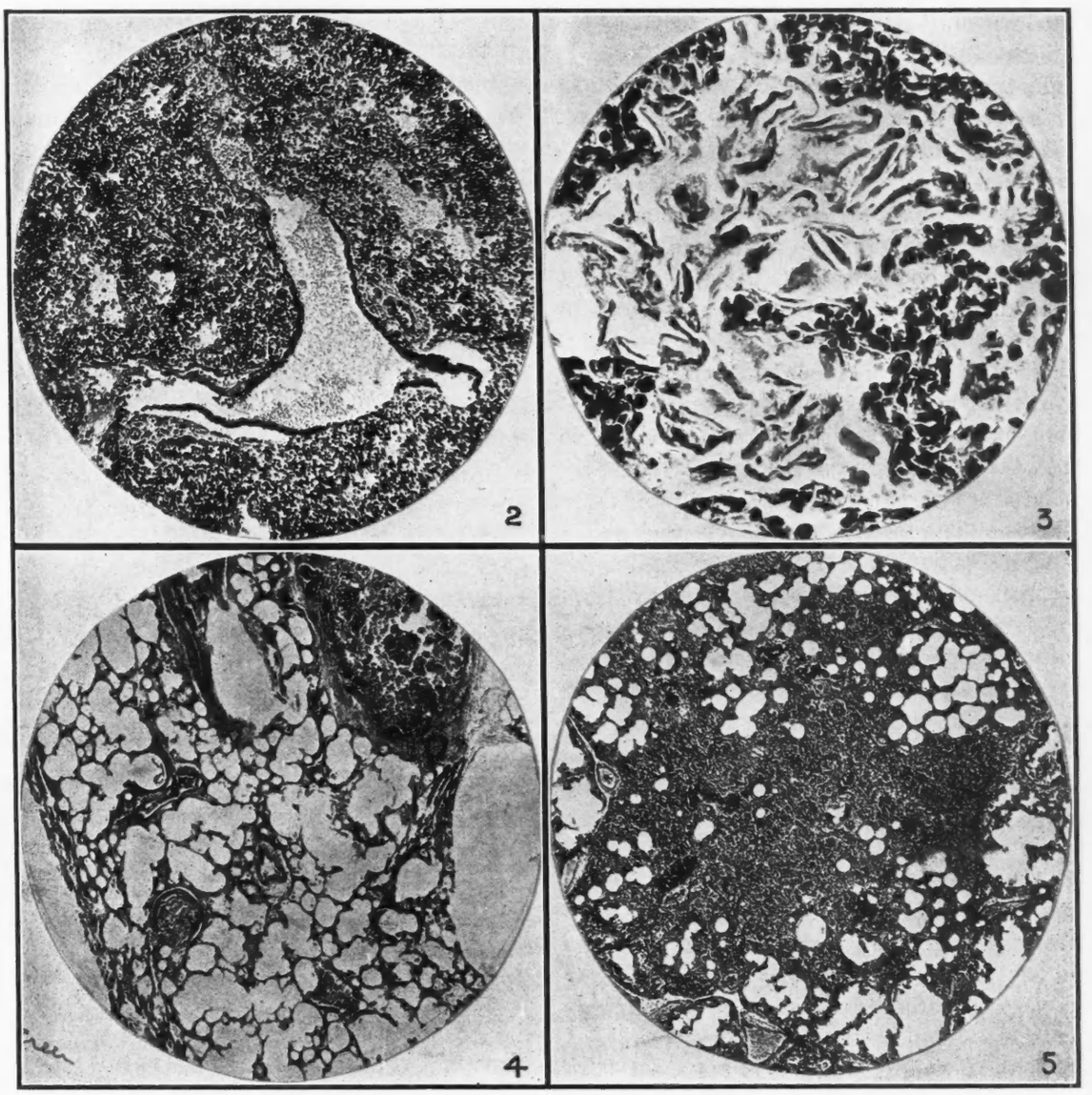

FIG. 2.—Intra-uterine aspiration pneumonia. Amniotic fluid constituents filling a dilated bronchus and two alveolar spaces.

FIG. 3.—Intra-uterine aspiration pneumonia. Desquamated epidermal cells of amniotic fluid fill an alveolus.

FIG. 4.—Extra-uterine aspiration pneumonia. Food and bacteria fill dilated bronchi; slight peribronchial exudate and marked emphysema.

FIG. 5.—Peribronchial exudate, with compressed bronchi containing disintegrating epithelium. No discoverable extra-pulmonary focus.

III. Bronchial and Peribronchial Infections Without Discoverable Extra-respiratory Focus

This group comprises 43 per cent of the entire series. The pneumonia seems to follow a primary upper respiratory infection or some nutritional disturbance. It is also similar to the infection which occurs in older infants secondary to many of the acute infectious diseases.

The average age of these infants was 13 days, and less than half were premature.

A further anatomical classification of this group can only be satisfactorily based on the bacteria causing the tissue reaction, because certain types of inflammation can be identified with a certain organism. Even in mixed infections the picture tends to be that of the organism which predominates or is of greatest virulence. Microscopic sections usually show a definite tendency of the exudate to be peribronchial in distribution (Fig. 5). This indicates mainly a lymphogenous extension, in contrast to the direct bronchial aspiration infections. As these pneumonias in the new-born nearly always follow an upper respiratory infection, it is not surprising that an exudative purulent otitis media is the most frequently associated lesion. It was present in 18 of these 42 cases. The relatively short and wide Eustachian tube in the infant may predispose to a direct extension of pyogenic bacteria from the nasopharynx. The absence of other purulent foci is a feature of this group.

The clinical symptoms recorded were as variable as in the aspiration pneumonias, although these were usually more vigorous infants having no marked difficulty in swallowing. A feature of some cases was the very rapid course. Extreme prostration, little or no fever, and bouts of cyanosis lasted for only a day or two, with no symptoms referable to a respiratory infection, except perhaps more rapid breathing. The majority of infants, however were ill for an average of six days with a remittent temperature, diarrhœa, vomiting, rapid loss of weight, and sometimes twitching of the extremities. Symptoms and physical signs of pneumonia were described in less than 18 per cent of cases, and were nearly always part of the terminal picture.

Summary

In a series of 445 autopsies on infants up to one month of age, infections were found in 119 cases, 81 per cent of which were pneumonias.

In the absence of the morphologically specific spirochæte in the tissues, a diffuse interstitial proliferative reaction in many parenchymatous organs is accepted as the most reliable anatomical evidence of congenital syphilis.

Aspiration pneumonia was the immediate cause of death in most of our cases of congenital syphilis.

A case of probable intra-uterine pneumococcal septicæmia is briefly described.

Intra-uterine aspiration pneumonia results from asphyxia which is associated with large amounts of amniotic fluid constituents in the lungs. This fluid is frequently infected, probably in the birth canal, and is sucked into the smaller air passages during the first inspirations. The removal of this fluid without undue trauma is indicated at birth.

The aspiration pneumonias have clinical and pathological characteristics which differentiate them from other bronchial and peribronchial infections.

Otitis media is the most commonly associated suppurative lesion, and it is almost entirely confined to the extra-uterine respiratory infections.

Although a definite anatomical classification of pneumonia has been found applicable in this series of new-born, the clinical picture is non-specific and most indefinite. Physical signs in the lungs are found in a minority of cases.

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THE VITAMIN D CONTENT OF EGG YOLK*

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MOST foods ordinarily consumed are devoid of vitamin D. Traces of this vitamin are found in summer milk and summer butter, but egg yolk is the only foodstuff that contains appreciable amounts of vitamin D, with the exception of fish oils. The vitamin D in egg yolk, together with its high concentrate of grade A protein and phosphorus, makes it a particularly valuable food.

The presence of appreciable amounts of vitamin D in egg yolk was first demonstrated by Mellanby,[1] who cured rickets in a dog by the addition of egg yolk to a rickets-producing diet. Hess[2] reported that egg yolk had considerable antirachitic potency, since its inclusion in a diet cured or prevented rickets in rats. In addition, he carried out prophylactic treatment of twelve infants to forestall the development of rickets in the winter months. One egg yolk per day was added to their diet in December, and in March no clinical nor x-ray signs of rickets were observed. The level of inorganic blood phosphorus did not show the usual seasonal ebb but was maintained at the summer level. He later found that 0.05 gram fed daily would protect rats on a low phosphorus diet from rickets, but was less effective when rats were on low calcium diets. Boiling the egg yolk for twenty minutes did not appreciably lower the vitamin D content, but keeping it in a dried state caused deterioration. The yolk also conferred protection when injected subcutaneously.

Casparis, Shipley and Kramer[3] demonstrated definite healing of rickets, in most cases severe, in seven negro children upon adding one or two eggs daily to a diet of cereal and milk. They also confirmed the previous findings with rats. Collier[4] prevented the development of leg weakness in chicks, a condition essentially similar to rickets in mammals, by feeding them hard boiled eggs. Tso[5] reported that egg yolk in small quantities furnished a vitamin-like substance which enabled the body to mobilize and economically utilize its apparently limited supply of calcium. The Chinese method of preserving ducks' eggs did not seem to destroy the antirachitic value of the yolk when incorporated in the diet to the extent of 5 per cent.

THE EFFECT OF THE RATION OF THE HEN ON THE VITAMIN D CONTENT OF EGG YOLK

The full details of this aspect of the present investigation will be given in a separate communication and only the points of medical interest will be reported here. The hens, consisting of Barred Plymouth Rock pullets, were divided into groups of 14 each, confined indoors and fed a standard basal diet. Group I served as control. To the food of Group 2 was added 1 per cent 2.5D cod liver oil (the average standard cod liver oil); to Group 3, 1 per cent 10D cod liver oil (the average standard cod liver oil fortified with viosterol); to Group 4, 1 per cent 2.5D viosterol; to Group 5, 1 per cent 250D viosterol, and to Group 6, 1 per cent 25,000D viosterol. The birds were started in these groups in January and the eggs laid by each group during the first two weeks of August were pooled for assay. The vitamin D potency of the egg yolk was assayed by the standard line test technique of Steenbock and Black,[6] a modification of that of McCollum, Simmonds, Shipley and Park.[7] The minimum amount of fresh egg yolk necessary to give a two-plus healing of rickets was determined in each case. The num-

* Read before the annual meeting of the Canadian Society for the Study of Diseases of Children, 1933.

This work formed part of a thesis presented by one of the authors, (H.D.B.) for the degree of Doctor of Philosophy, in the Department of Biochemistry, University of Toronto.

ber of Steenbock vitamin D units per average egg yolk is given in Table I. These results show that the vitamin D content of egg yolk can be markedly influenced by the addition of vitamin D to the diet of the hen.

TABLE I.

STEENBOCK VITAMIN D UNITS PER AVERAGE EGG YOLK

Group	*Diet*	*Vitamin D Units per Average Egg Yolk*
1	Basal	3.8
2	" + 2.5D cod liver oil 1%	30.0
3	" + 10D cod liver oil 1%	57.0
4	" + 2.5D viosterol 1%	30.0
5	" + 250D viosterol 1%	818.0
6	" + 25,000D viosterol 1%	18,000.0

THE EFFECT OF EXPOSURE OF HENS TO ULTRAVIOLET RAYS ON THE VITAMIN D CONTENT OF EGG YOLK

Hens were placed on the basal diet and divided into three groups of twenty birds each. The groups were confined in pens the fronts of which were open, the birds thus receiving whatever sunshine was available. The number of hours of available sunshine during the period of the investigation was as follows: January, 30; February, 95; March, 117; April, 185; May, 218, June, 271, and July, 254. In addition Group 2 was irradiated at a distance of three feet by a mercury vapour quartz lamp for twenty minutes daily, except Sunday. Group 3 was under the same conditions as Group 1, with the addition of 1 per cent 2.5D cod liver oil. Two dozen eggs from each group laid during the second week of each month were collected and the yolks pooled for assay. The results are given in Table II.

TABLE II.

STEENBOCK VITAMIN D UNITS PER AVERAGE EGG YOLK

	Control Group	*Irradiated Group*	*1 Per Cent Cod Liver Oil Group*
	Units	Units	Units
January....	4.5	5.6	30.0
February...	3.9	6.0	27.7
April.....	4.2	5.1	25.7
May.....	5.1	6.0	28.1
June.....	4.5	5.3	30.0
July.....	4.7	5.0	32.1

It is evident from these results that exposure of hens to sunshine or ultraviolet rays from a mercury vapour lamp under the conditions of the investigation had very little effect in increasing the vitamin D content of the egg yolk, in contrast to the results obtained by the addition of cod liver oil to the diet.

THE VITAMIN D CONTENT OF MARKET EGGS

Since there is a wide variation in the rations fed to laying hens, especially in the amount of vitamin D supplied, there are probably just as wide variations in the antirachitic potency of eggs received by the consuming public. In order to test such variations, one dozen fresh eggs, known as "fresh extras", were purchased monthly from each of twelve different producers. The yolks from one egg of each dozen were pooled for assay. The results of the vitamin D assays are shown in Table III. For comparison the values obtained for the yolks laid by hens receiving the basal diet supplemented by 1 per cent of cod liver oil, the usually recommended dosage, and the control group receiving no added vitamin D are included.

TABLE III.

STEENBOCK VITAMIN D UNITS PER AVERAGE EGG YOLK

	Market Fresh Extras	*Basal Diet*	*Basal Diet + 1 Per cent Cod Liver Oil*
	Units	Units	Units
January....	10.0	4.5	30.0
February...	7.5	3.9	27.7
March.....	9.0	...	....
April.....	10.0	4.2	25.7
May.....	7.5	5.1	28.1
June.....	9.0	4.5	30.0
July.....	7.5	4.7	32.1

From the results given in Table III, it is seen there is not a wide variation in the vitamin D value of market fresh extras as purchased throughout the winter and summer months. The average number of units per egg yolk found was 8.6. On the basis of Steenbock's standard cod liver oil,[8] which contains 45 Steenbock units of vitamin D per teaspoonful, it would require approximately five average market eggs to equal the vitamin D content of one teaspoonful of Steenbock's standard cod liver oil.

THE EFFECT OF STORAGE OF EGGS ON THE VITAMIN D CONTENT

It has been suggested that eggs which are put into cold storage during the summer months, which usually reach the consumer

during the late fall and winter, might contain more vitamin D than fresh eggs laid during the winter months.[9] Accordingly, three cases of eggs, put in commercial storage in April, May and June, 1931, at 29 to 30°, were removed in February, 1932, the average duration of commercial storage. The yolks of two dozen eggs were pooled for each assay. The findings are given in Table IV. For comparison, the antirachitic potency of fresh extras purchased from the same source in April, May and June are also included.

TABLE IV.

STEENBOCK VITAMIN D UNITS PER AVERAGE EGG YOLK

	Storage Eggs	*Fresh Eggs*
	Units	Units
April	11.2	10.0
May	8.5	7.5
June	8.1	9.0

These eggs were laid in April, May and June and kept in storage until the following February, which is usually the end of the storage season.

These results show that the vitamin D content of storage eggs released in February is slightly better than the vitamin D content of fresh eggs purchased at that time. A comparison of the potency of the fresh eggs obtained in the corresponding months of 1932 with those put in storage during those months of 1931 would suggest that there is little or no loss of vitamin D in cold storage. A further study of this problem, placing eggs of definite antirachitic potency in storage, is at present nearing completion.

THE THERAPEUTIC VALUE OF EGGS IN HUMAN RICKETS

On January 21, 1932, a negro, one year of age, was admitted to hospital with marked rickets, showing enlarged epiphyses, Harrison's sulcus, rachitic rosary and curved tibiæ. A roentgenogram of the forearm and wrist joint taken shortly after admittance, which shows florid rickets, is shown in Fig. 1. For six days, from January 21st to January 27th, 3 teaspoonfuls of cod liver oil were given daily. From January 27th to February 4th no cod liver oil was given, but one egg daily from the control group of hens receiving no vitamin D supplement was included in the diet. A previous assay had shown that these eggs had some antirachitic potency. Fig. 2 is a roentgenogram of the forearms of the patient at the end of this period. Some improvement in calcification is shown. From February 4th to March 24th the child received one egg daily from the hens receiving 1 per cent of 250D viosterol. These eggs, as shown in Table I, have excellent antirachitic value by rat assay. Fig. 3 is a plate of the forearms taken at the end of this treatment. It will be seen that the rachitic condition has been entirely alleviated.

SUMMARY

1. The vitamin D content of egg yolk can be markedly increased by the addition of vitamin D to the diet of the hen.

2. Exposure of hens to sunshine or ultraviolet rays from a mercury vapour quartz lamp has little effect in increasing the vitamin D content of egg yolk, in contrast to the results

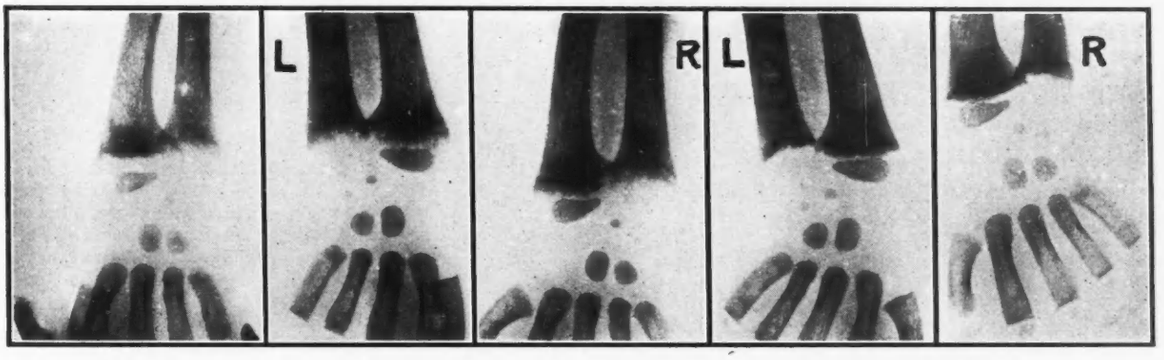

FIG. 1 FIG. 2 FIG. 3

FIG. 1.—Roentgen-ray of left forearm on admission. Marked rickets.

FIG. 2.—Roentgen-ray of forearms after treatment with eggs from hens receiving cod liver oil. Healing rickets.

FIG. 3.—Roentgen-ray of forearms after treatment with eggs from hens receiving viosterol. Rickets cured.

obtained by the addition of cod liver oil to the hen's diet.

3. The vitamin D content of market eggs (fresh extras) varied only slightly throughout the year.

4. The average number of Steenbock vitamin D units per average market egg yolk (fresh extras) is 8.6. It would require approximately five of these egg yolks to furnish the vitamin D equivalent of one teaspoonful of Steenbock's standard cod liver oil. By the addition of cod liver oil to the hen's diet the vitamin D content of the egg can be increased more than three fold.

5. There is little or no loss of vitamin D in eggs kept in cold storage for ten months.

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ROENTGEN RAY DIAGNOSIS OF PLACENTA PRÆVIA*

(WITH REPORT OF TWO CASES)

BY J. FRIEDMAN, M.D. AND D. O. MACDONALD, M.D.,

Montreal

RECENTLY, the placenta has been roentgenologically demonstrated, in animal experiments, by intravenous or intracardiac injection of thorotrast. Various investigators, such as Ehrhardt,[1] Gragert,[2] Heuser,[3] Vajano,[4] *et al.*, have shown that the placenta is capable of absorbing a large amount of the thorium circulating in the blood, of retaining it for hours and days, and of eliminating it. However, the placentography interfered with fetal nutrition and led frequently to abortion. For this reason, and because of the large quantity of thorium required for the visualization of the human placenta, and its slow elimination, this method is not yet suitable for clinical use.

Menees *et al.*[5] demonstrated the placenta by injecting into the amniotic sac about 10 c.c. of a 1:1 solution of U.S.P. strontium iodide through the anterior abdominal wall. The placenta appeared as a filling defect or a flattened area, best seen in profile or oblique view. In their 21 cases they saw no injurious or toxic effects, except in a case of placenta prævia, where probably the placenta had been entered. Kerr and MacKay[6] discontinued this method, as the fetus died in 3 of their 10 cases. They used instead a derivative of iopax, with no untoward effects in their 10 cases, though the injection had a great tendency to terminate the pregnancy.

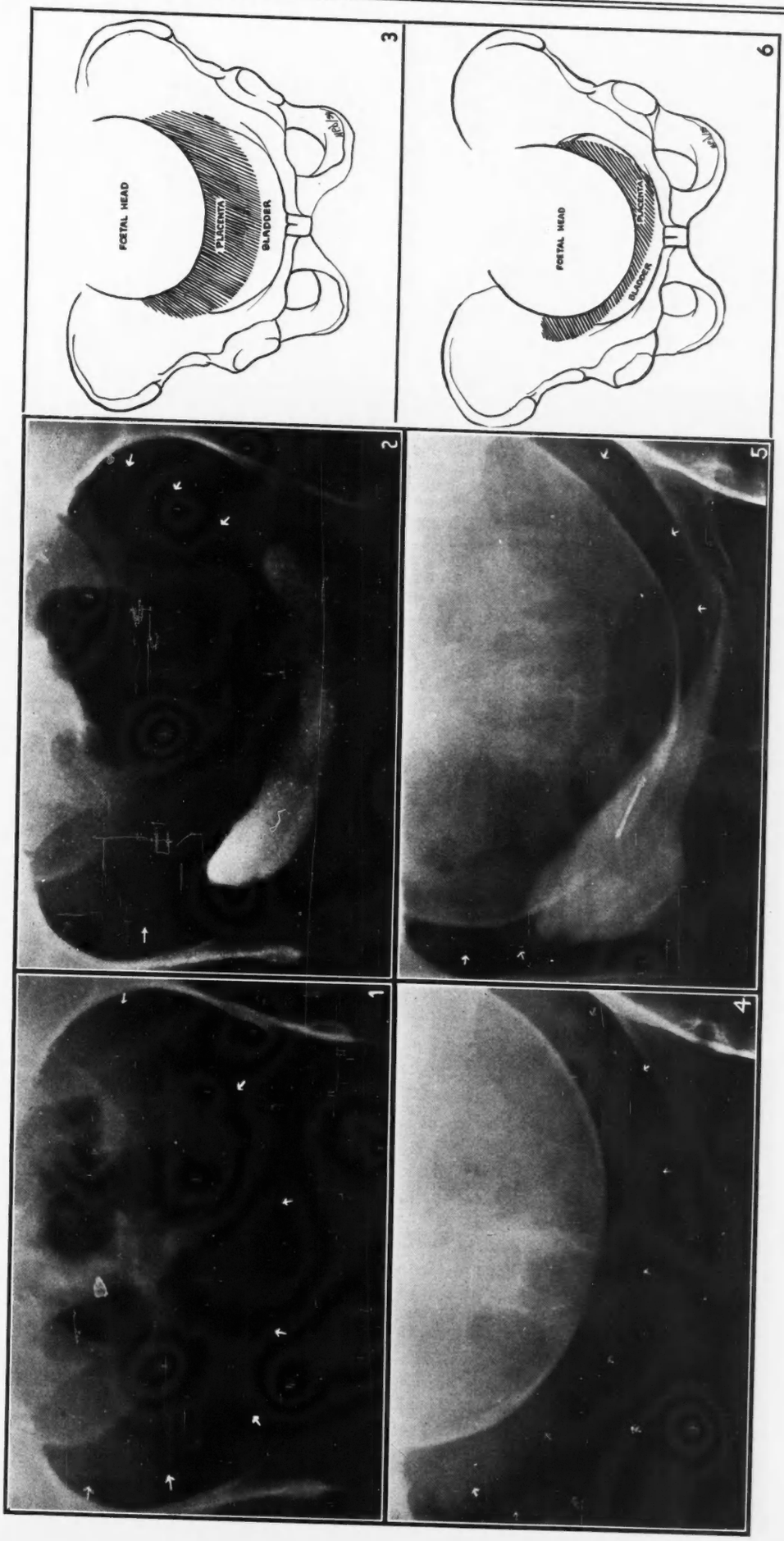
Snow[7] was able, without any special technique, to visualize the placenta in the routine roentgen examination of 60 pregnancies. Several of his cases were proved by operation. There was no case of placenta prævia in his group.

Ude[8] *et al.* published recently 3 verified cases of placenta prævia which were recognized roentgenologically without injecting any radiopaque substance into the uterine cavity. Since theirs is the only report of this method in the literature, we should like to add 2 similar cases from our own experience.

CASE 1

Mrs. H.H.D., aged 34, para-iii, was admitted to the outdoor department of the Woman's General Hospital on March 15, 1934. Her last menstrual period had occurred in July 15, 1933. About one month before admission, she developed slight vaginal bleeding, which cleared up under bed rest. Physical examination revealed a pregnancy of about 7½ months' duration. The head of the fetus was located in the left lower quadrant, with the back directed to the left. The placental bruit was heard most distinctly in the right lower quadrant. On vaginal examination the cervix was soft and œdematous. A pulsation could be distinguished in the right lower pelvis from a boggy mass continuous with the uterine wall. There was no bleeding from the cervix. The clinical findings therefore indicated the presence of placenta prævia. The patient was referred for roentgenological examination the same day.

* From the Departments of Roentgenology and Obstetrics of the Woman's General Hospital, Montreal.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FOETAL HEAD
PLACENTA
BLADDER
6
FOETAL HEAD
PLACENTA
BLADDER
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4

A single fetus in the left occipito-anterior position, the head above the pelvic inlet, corresponding in size to an age between 7 and 8 months was found. In Fig. 1 a faint semilunar opacity is distinctly outlined in the true pelvis along the fetal occiput, 3 cm. in thickness, (marked by arrows) bulging in the centre and becoming thinner towards the periphery. Fig. 3 is a diagrammatic representation. The placenta is interposed between the fetal head and the bladder, which shows in Fig. 2, after injection of 25 c.c. of 5 per cent sodium iodide, a crescentic indentation of its upper border. These findings suggested a placenta prævia centralis.

The patient was admitted to the hospital for a selected Cæsarean section. She remained for a month and no further bleeding occurred. Then she became discontented and left, and later entered another hospital, where she was delivered by version and extraction of a dead fetus. The diagnosis at delivery was a placenta prævia centralis.

CASE 2

Mrs. M.P., aged 36, para-ii, was admitted to the outdoor department of the Woman's General Hospital on April 16, 1934. Her last menstrual period had occurred on October 9, 1933. She reported regularly every fortnight and on July 14th noticed slight vaginal bleeding, which cleared up under a few days' bed rest.

Physical examination revealed a pregnancy of about 8 months' duration. The head of the fetus was located in the left lower quadrant, not engaged, with the back to the left. The placental bruit was heard best in the right lower quadrant. Pelvic examination revealed a soft closed cervix and no bleeding. The head could only be pushed down in the pelvis with difficulty; no pulsating mass could be felt. However, as the history suggested a possible placenta prævia, she was admitted, and a roentgenological examination made on August 17, 1934.

A single fetus at term, in the left occipito-anterior position was found, with the head not engaged. Fig. 4 reversed shows a distinctly outlined soft shadow, 1 cm. thick, accompanying the fetal skull from the glabella to the occiput and marked by arrows. Another opacity on the left, also outlined by arrows, proved to be the filled bladder, and disappeared after emptying of the bladder. Fig. 6 is a diagram of the arrangement. After injection of 100 c.c. of 5 per cent sodium iodide the bladder is seen to be displaced to the left and downwards, with a concave upper border and the placenta at the right distinctly outlined (Fig. 5). These findings were suggestive of a placenta prævia marginalis.

On the strength of the history and the roentgenological findings and as the patient was at term, a classical Cæsarean section was performed. When the uterus was opened, a low implantation of the placenta was found on the right side, with the margin covering the lower uterine segment. A healthy, full term child was delivered and the mother made an uneventful recovery.

SUMMARY

A short review of the roentgenological visualization of the placenta is given.

Two verified cases of placenta prævia, with the x-ray findings, are presented.

The diagnosis of the variety of placenta prævia present, and also the differentiation between placenta prævia and accidental hæmorrhage are well known difficulties in obstetrics. Therefore any means of assuring a more correct diagnosis which is harmless to the mother and fetus is of great value.

NOTE: We would like to thank Dr. Wm. Burnett, of the Department of Obstetrics, for permission to publish these two cases.

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THE FREI TEST FOR LYMPHOGRANULOMA INGUINALE: RECOVERY OF ANTIGEN FROM PUSTULAR REACTION.—M. J. Strauss and M. E. Howard report experiments that they believe may shed some light on the nature of the Frei reaction. The cases used in these experiments included: a clinically typical case, strongly positive to a known Frei antigen, which furnished some of the experimental antigen used, an atypical case in which a large abscess and little peri-adenitis were present, a typical case presenting, in addition, a large abscess, a rectal case in which there were fistulas exuding pus, a rectal case in which there were no fistulas but a typical stricture, a clinically typical case and a severe case in which there was one particularly large abscess from which further experimental antigen was obtained. The experiments suggest that the contents of the pustule resulting from the Frei test contained an antigen identical with that of Frei. From which three possibilities suggest themselves: (1) the active principle of the antigen is present in the blood and is found in the pus as a result of this; (2) new antigen was formed just as it is in active lesions; or (3) some of the antigen injected into the skin was still present and was recovered in the pus. The authors state that their results suggest that: (1) if a Frei reaction is strong enough to cause vesicle formation the contents of this vesicle are capable of producing a reaction similar to the Frei reaction in patients with lymphogranuloma inguinale; (2) the substance causing this reaction is probably a remainder of the Frei antigen originally injected and not combined with antibodies; (3) these antibodies are not circulating antibodies but fixed antibodies.—*J. Am. M. Ass.*, 1934, **103:** 1830.

CRYPTOMYCES PLEOMORPHA: A NEW ORGANISM ISOLATED FROM THE BLOOD OF A CASE OF METASTASIZED CARCINOMA OF THE BREAST*

BY O. C. GRUNER, M.D.,

Montreal

THIS report is presented for the following reasons. (1) The organism was detected in the circulating blood by direct examination (Fig. 1). (2) It was detected among the tumour cells in the original neoplasm, in sections which had been made four years previously (Fig. 2). (3) An organism, evidently of the same type, has been found in seven previous cases, but its cultural characteristics and pathology had not presented the same degree of completeness. (4) Though in part resembling other fungoid organisms which have been described before in human pathology, this one seems to present additional distinctive and interesting features of its own. (5) Careful observations of the living cultures have shown that in some phases this organism exactly mimics the cell-elements of human blood, and also the so-called Plimmer bodies and Russell fuchsinophile bodies of some malignant tissues, and, in addition, has forms which are just like the free nuclei and various sized granules found in many sections of neoplasms. These mimicries explain how the organism may effectually escape detection in the routine observation of tissues and blood.

Isolation.—From the blood of a case of carcinoma of the breast (excised five years ago) with intrathoracic metastasis; previously, in other cases, from the tumour tissue.

Cultural characteristics.—The initial growth appeared only after seven days' incubation at room temperature. After developing a raised formation like that of sporotrichum, but extremely hard in consistence, it remained stationary for two weeks, despite repeated attempts at subculture on a great variety of media of all gradations of pH. Finally, the use of the patient's serum, and asparagus extract to enrich the glycerine-glucose-peptone water, proved to induce cultural success, good growths now appearing in all subsequent cultures in 48 hours. The organism was strictly aerobic. Room temperature was best. The optimum pH was 6.8 to 7.0. Bacterial contamination effectually antagonized the cultures.

On *asparagus agar.*—Within 48 hours a small round orange-tinted colony appears with elevated glistening centre. As this gradually enlarges it becomes coral pink. A somewhat

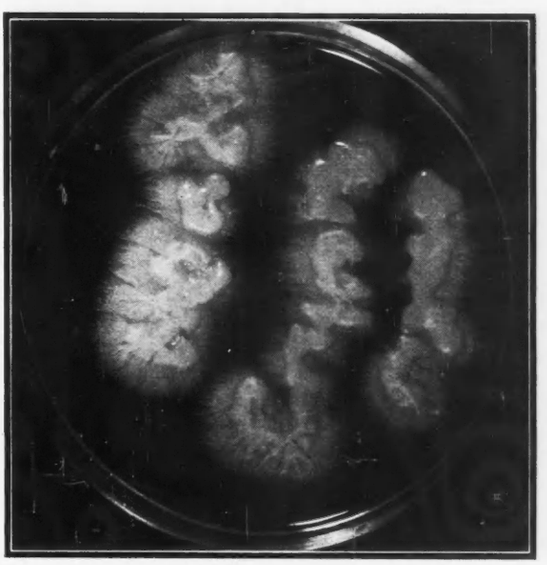
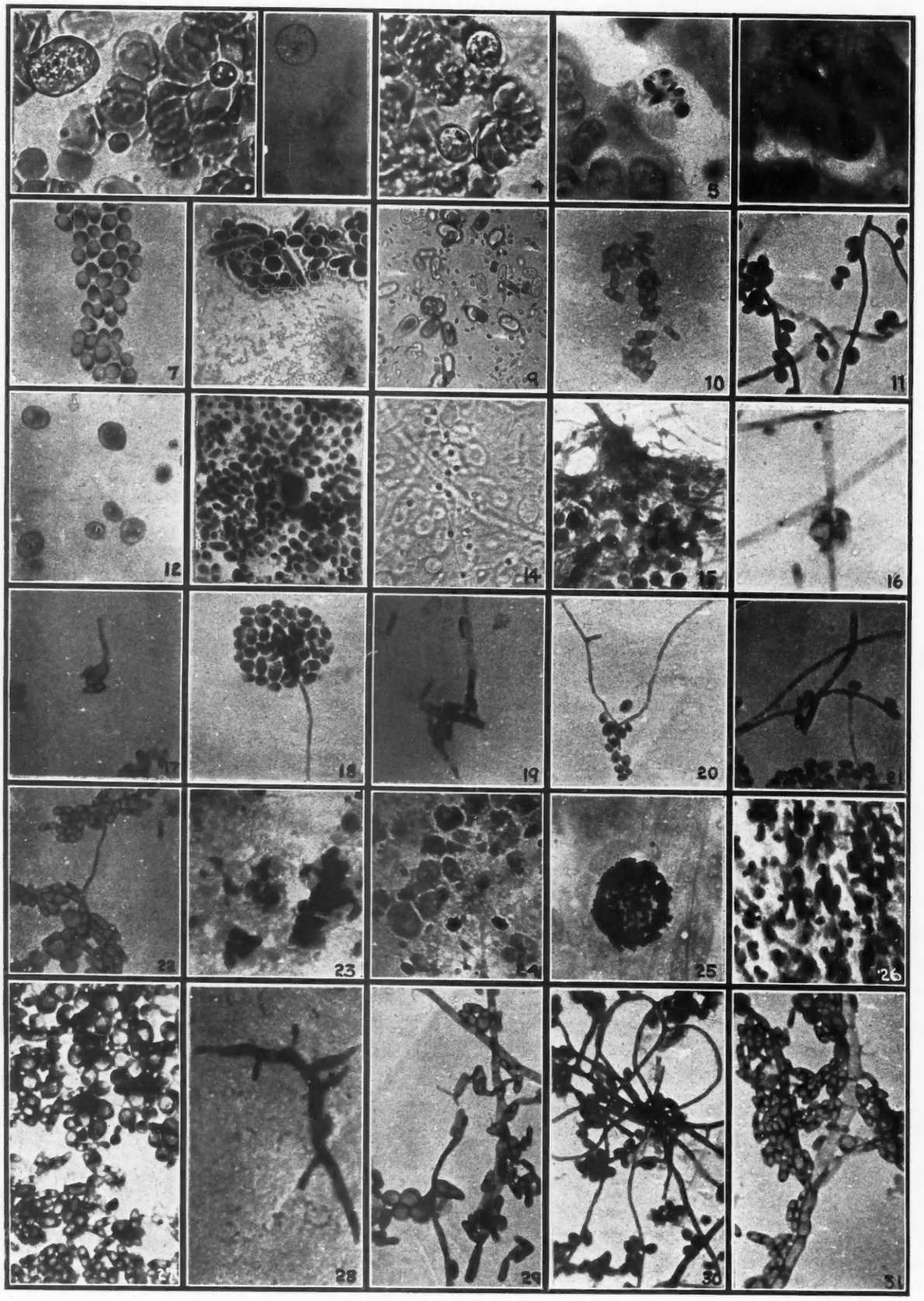


FIG. 1.—Petri dish culture, 12 days old. The central raised growth consists of the torula-like spore forms, and is of coral colour in the original. The delicate hairy outgrowth is the mycelial phase.

hardened pellicle forms in the centre and delicate threads form at the periphery, at first whitish, and, later, faintly coral-pink (Fig. 1). Only spore forms occur in the initial colony. Hyphæ develop in from 6 to 10 days, showing various forms as the culture ages (Figs. 17-31). After 14 days the pink centre wrinkles up, much like sporotrichum, *Mycobact. tuberculosis*, etc., and the whole growth constitutes quite a firm membrane rather firmly adherent to the

* From the Department of Surgery, McGill University, Montreal.

Under a grant for Cancer Research contributed to Dr. E. W. Archibald by an anonymous donor.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EXPLANATION OF FIGURES

FIGS. 2, 3, 4.—From three fields showing the spherical bodies in the fresh unstained blood. Note differently sized bodies, the larger ones being the same size as the red cells, forming flattened discs. Micro-spores (very refractile bodies) are seen among the cells; these are the same size as platelets. (Oil-immersion lens).

FIGS. 5, 6.—Two fields from the original tumour tissue, showing similar forms free in the lymphatic spaces. (Oil-immersion lens).

Figures showing pleomorphism in the same culture at different dates. (Magnification in Figs. 7 onwards, Oc. 15, Zeiss, and obj. 20).

FIG. 7.—Rounded forms like blastomyces (4 days).

FIG. 8.—Elongation of these rounded bodies into tubular forms, with halo or capsule.

FIG. 9.—Oval forms like those found in "blastolysin".

FIG. 10.—Fission-forms, or oidia (10 days).

FIG. 11.—Budding forms like yeasts (5 days).

FIG. 12.—Megaspores or ascospores with highly refractile capsule, like those in Figs. 2–4.

FIG. 13.—Torula forms in thick smear, mimicking tumour-cell nuclei

FIG. 14.—Highly refractile micro-spores, unstained; there is a background of torula forms and two hyphæ.

FIG. 15.—Chlamydospores among mycelium (14 days).

FIG. 16.—Cluster of megaspores appearing as a sessile sporangium. Stages of mycelial growth.

FIG. 17.—Germination of diplo-spore (36 hours).

FIG. 18.—Cluster of spores only one of which germinates.

FIGS. 19, 20, and 21.—Secondary branching (3 days).

FIGS. 22 and 29.—Appearance of forms like those in Fig. 7 (10 days).

FIG. 23.—Smear from nodule in rat which had been inoculated with the organism in the submammary region. Note the megaspore forms with clear capsule.

FIG. 24.—Similar smear from another rat similarly treated; note the oval darkly stained bodies.

FIG. 25.—Splenic smear from rat dying of generalized septicæmic infection, showing morula mass of budding toruloid forms (Leishman stain).

FIG. 26.—Section of nodule at site of inoculation, showing spindle cells with yeast-like forms intermingled.

FIG. 27.—Transitions from oidia form to blastomyces form (tenth day).

FIG. 28.—Early mycelium with lateral buds like sporotrichum (fifth day). (Oil-immersion lens).

FIG. 30.—Loop-formation and the beginning of a complex hyphal mass, with rapid formation and multiplication of buds, which themselves bud again.

FIG. 31.—A thick hypha in which oval torulæ seem to be forming; splitting into oidia is commencing (14 days). In these last two figures the existence of + and — forms is suggested.

surface of the medium. Finally, a very fine white powdery deposit appears all over the growth, and no further change occurs.

On *asparagus glucose glycerine peptone water,* a pellicle forms in 48 hours; this is in the form of a ring at the surface, adhering to the glass, and made up almost entirely of mycelia, the spores falling to the bottom of the tube in large numbers. A pink colour appears in 7 to 10 days, and the ring can be detached from the glass, when it will remain intact and hanging in the medium.

Gelatine.—Not liquefied; very slow growth. *Meat-extract media.*—Very slow growth; colonies very small; whitish; no colour. *Plain glucose glycerine agar.*—Extremely slow growth; small glistening colonies; no colour; no mycelium. *Sabouraud.*—Very slow colourless growth; very small and few hyphæ; spores much smaller than those on asparagus media. *Dextrose-tartaric acid.*—No growth (in distinction from usual fungi). *Potato.*—Very scanty dull yellow growth, slowly turning pinkish. *Tomato.*—Very luxuriant growth in 48 hours; pink colour slightly paler than the flesh of the fruit. The condensation water rapidly fills with torula forms and turns pink. *Milk.*—Budding torula forms develop in 72 hours; no coagulation; no acid. *Peptone water.*—No indol. *Nitrate media.*—No nitrite formation. *Sugar-reactions.*—No fermentation of glucose; gas, but no acid in lactose; saccharose, nil.

Stainability.—Dilute carbol-fuchsin gives the best results. Methylene blue stains relatively feebly. It is Gram-positive. It is not acid-fast. Rossophilia is almost absent.

Morphology.—This organism is very pleomorphic. Thus at different times, in the same culture tube, one may see transient micrococci like Doyen's[1] M. neoformans of 1904 (Fig. 8), spherical forms like Sanfelice's blastomyces (1896) (Fig. 7), tubular forms apparently answering v. Brehmer's[2] description of his Siphonospora (Fig. 8); oval resting spores like those found in a specimen of Schmidt's[3] "Blastolysin" (Fig. 9); combined with mycelial formations (Fig. 11).

The following forms of reproduction are observable, as met with in other fungi: (a) fission forms or oidia, or diplospores (Fig. 10) suggestive of schizosaccharomyces; (b) bud-formation as usual in torula or saccharomyces (Fig. 11); (c) ascospores, or "megaspores" (Fig. 12) in keeping with zygosaccharomyces; (d) very minute microspores (Fig. 14), which are highly refractile and arise by detachment

from (b); these are metachromatic with Leishman and with methylene blue; (e) chlamydospore formation (Fig. 15); (f) lateral buds (Fig. 28), as in typical sporotrichum; (g) sessile sporangia in the aerial mat (Fig. 16), suggestive of some mucors; (h) still smaller particles occur, possibly filter-passing. There is a fairly regular sequence. Thus from b to d, from b to mycelium (first week), from mycelium to f, and to a, and to e (second week); from a to c and to g. The whole series ends in about three weeks, when a new subculture becomes essential.

The organism is therefore an ascomycete, having affinities with sporotrichum, cryptococcus and blastomyces. It is given the name of *Cryptomyces* because it combines mycelial formation with an obscure biology and incidentally an effective concealment when situated in invaded tissues.

Pathogenicity. — It is pathogenic for white rats when given intrapleurally, and for white mice when given into the submammary tissue. It was recovered true to its original cultural characteristics in pure form from the blood and all organs of these animals but developed very little mycelium. A high monocytosis was striking and early. The progeny of a female rat inoculated with the organism while pregnant developed generalized infection with the same organism, dying 21 days after birth. Subcutaneous inoculation produced indurated areas in which the organisms were plentiful. After 12 days nodules formed in which spindle-shaped connective-tissue cells were predominant, and megaspores were abundant among them (Fig. 26). Mycelium was not detected in the tissues.

Cuti-reaction.—Skin reactions have been obtained by using an emulsion of this organism on the patient whence it was derived, as well as on several other malignant cases, including sarcomas, but not on persons in ordinary health. Further studies on this point are in progress.

Relation to malignant disease. — Naturally, such an organism may be primary or secondary. If the former it would presumably act in virtue of some carcinogenic substance being formed among the products of its metabolism. In any case, the frequency of its association with new-growths remains to be established. The usual arguments against a microbic origin of the disease naturally arise.

DISCUSSION

An accidental admixture of two or more organisms would provide a simple explanation of the pleomorphism. The two main forms have already been separately described from time to time as being causal for cancer, to be subsequently rejected as "contaminants", namely, the yeast-like forms and the mucor-like forms. Moreover, in the present case, the cultures after passage through the infected rats and mice showed a dominantly blastomycetic form, with mycelial formation almost negligible. Further, the patient had been for a few weeks in a region where sporotrichosis occurs, though never having the slightest evidence of lesions of that kind.

The reasons for believing the organism to be single are: (a) the constancy of the occurrence of the dual forms in succession, at the same time intervals in all subcultures; (b) the ability actually to observe the one form changing into the other; (c) the inability to separate them permanently by plating; (d) the cultural characters; (e) the possession of pathogenicity; (f) its unique character; (g) the unlikelihood of a chance admixture of distinct organisms resulting in such a close symbiosis as actually to manifest conjugation.

Of some interest is the experience of the animal lesions produced, in that the organism is found closely mingled with the reactive infiltration of predominantly monocytic type, and shows in the sections appearances which strongly recall those seen in sections of carcinomas and sarcomas, though such particles are usually regarded as unessential bacterial or degenerative components. Applied to human tumour histology, the presence of such microscopic objects would seem to require an explanation.

Of further interest is the evidence of sexuality in this organism (in common with other fungi), though the question of haploid and diploid phases has not been taken up. The delay in obtaining good subcultures would be explained by the difficulty of finding a medium favourable for the conjugation of the + and − elements. This provides a useful suggestion—that such occupants of tumour tissue (whatever their presence means) present a sexuality factor which determines ease or difficulty of culture outside the body. The repeated observation of the megaspore forms inside the phagocytic cells in the infected animals with their mimicry of the Plimmer-body and other

inclusions in human cancers supports this suggestion quite definitely.

CONCLUSIONS

A report is given of a new organism, here called *Cryptomyces pleomorpha,* which is placed among the ascomycetes.

The question of etiological relationship with malignant disease is necessarily left open.

Very grateful thanks are due to Dr. Archibald and to Dr. Mark Kaufmann for enabling this case to be worked out, and also to Dr. Pauline Beregoff, for recently undertaking further tests on animals.

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THE REACTIONS ATTENDING THE INTRAVENOUS USE OF THE ARSPHENAMINES*

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THE physician who would explore the therapeutic possibilities of the arsphenamines should be thoroughly cognizant of the various reactions which occasionally follow their use. The causes of the reactions are probably as diverse as are the reactions themselves, and, though not yet fully understood are gradually becoming clearer as a result of intensive study by numerous investigators.

Arsphenamine was originally prepared by Ehrlich and Bertheim by the reduction of 3–amino 4– hydroxyphenyl arsenious oxide, for brevity termed "arsenoxide". This substance is twenty times more toxic than arsphenamine, and is in part reformed by exposing arsphenamine to the atmosphere. Since the work of Voegtlin and Smith,[1] later confirmed by Schamberg, Kolmer and Raiziss,[2] showing that arsenoxide was many times more trypanocidal than arsphenamine or neo-arsphenamine *in vitro,* there has been a growing conviction that arsenoxide formed in the body by the oxidation of arsphenamine is responsible for the therapeutic effect and also is partly the cause of its toxicity. Schamberg, Kolmer and Brown[3] have recently shown that the presence of arsenoxide in solutions of arsphenamine and neo-arsphenamine shortens the latent period for a trypanocidal effect when injected into rats with trypanosomiasis, but does not change the minimal curative dose per kilo of weight as compared with solutions free of arsenoxide. In other words, arsenoxide is rapidly trypanocidal, whereas arsphenamine is more slowly so, the time difference being required to oxidize the arsphenamine to arsenoxide in the tissues. The toxicity of the arsphenamines, in so far as arsenoxide is concerned, probably depends upon variation in the rate of oxidation in different individuals.

Arsenoxide is by no means the sole factor in toxicity. It is well known that acid solutions of arsphenamine produce a precipitate in the blood and may cause pulmonary embolism, and Milian[4] has shown that similar effects may be due to a relatively low alkalinity of the blood of the patient. It was formerly thought that neo-arsphenamine and sulpharsphenamine did not cause precipitates, but it has been shown by Shivers[5] that acid solutions of these drugs are quite capable of precipitating the plasma proteins. Jean Oliver and associates[6] proved that large doses of arsphenamine caused an agglutination of red cells, but only in the presence of an electrolyte such as sodium chloride. This agglutination and the subsequent vascular injury resulting from the thrombi can be prevented by the use of a buffer such as gelatin. Reactions may also be caused by impurities in the diluent and, as pointed out by Stokes and Busman,[7] sometimes rubber tubing contains, when new, a toxic agent which may be taken up by the solutions, causing them to produce febrile reactions when introduced into the blood stream.

THE NITRITOID CRISIS

The most frequent reaction is the nitritoid crisis, so named because of its similarity to the

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symptoms induced by the administration of amyl nitrite. The reaction appears with dramatic suddenness during or just at the end of the intravenous injection, or it may be delayed for several hours. The patient at the onset smells or tastes ether or some peculiar metallic substance. Most patients complain of this, and if it is followed by a flushing of the face and neck, or if there is sudden backache, a nitritoid crisis is imminent. In women the flushing may be masked by cosmetics, but when it is observed the injection should be stopped and adrenalin injected subcutaneously. As the reaction develops the patient acquires a sense of uneasiness, the face becomes swollen, the eyes suffused, the lips bluish, the skin becomes blotchy, and acute urticarial lesions may develop. Œdema increases and may involve the lungs, causing a wheezing respiration and increasing cyanosis; nausea and vomiting occur and the patient may become unconscious. These symptoms are due to vasomotor paralysis involving the larger vessels and arterioles, and are at once relieved by the use of adrenalin subcutaneously, as suggested by Milian over twenty years ago. A syringe containing 1 c.c. of this drug should always be in readiness when arsphenamine is being used. Once established the nitritoid crisis is likely to recur with subsequent injections. However, it can be prevented in a great many cases by giving 20 to 30 minims of aromatic spirits of ammonia in a little water five minutes before the treatment, and by administering the injection very slowly.

Medical Shock

Rarely, medical shock[8] supervenes. This reaction differs fundamentally from the nitritoid crisis, there being a capillary paralysis rather than a paralysis of the arterioles. Adrenalin is useless. The pulse becomes imperceptible and the blood pressure falls to an alarming degree. The vascular bed has become larger than the blood volume, and the circulation can only be restored by increasing the blood volume to fit the greatly increased area of the vascular bed. This requires the introduction into the blood stream of a large volume of normal saline, at least one litre. Owing to its low viscosity, saline rapidly disappears from the blood vessels and the patient must be carefully watched during the first twelve hours, and more saline given if the blood pressure again falls. A 7 per cent solution of gum acacia possesses a viscosity and osmotic pressure about equal to that of the blood and may be used, but it must be carefully neutralized. In our Alberta clinics we have a rule that when a patient with apparent nitritoid crisis fails to respond to adrenalin therapy within three minutes, medical shock is to be assumed and intravenous saline at once started.

The Jarisch-Herxheimer Reaction

The Jarisch-Herxheimer reaction occurs about eight hours after the first injection of an arsenical, and is a result of the destruction of large numbers of spirochætes and the absorption of their endotoxins or proteins. It occurs in the syphilitic lesion or lesions. There is an œdema, accompanied by a greatly increased infiltration of plasma cells and lymphocytes, sufficient sometimes to double the size of the lesion. It is a common observation in the chancre, and the regional lymph nodes are likewise affected. In new positive primary syphilis it may cause a profuse secondary rash. A similar reaction may occur in syphilitic tissue anywhere in the body, and herein lies its importance. In syphilitic aortitis with coronary involvement the œdema may occlude the coronaries, causing a fatal issue. In gumma of the larynx it may seriously interfere with breathing, and in aneurysm rupture may occur. In the nervous system, owing to the small amount of the drug reaching the lesions, the reaction may be delayed. It is obvious that the symptoms depend entirely upon the site of the syphilitic lesion. It is unimportant in early syphilis, except as a confirmatory diagnostic sign, but in late syphilis it may be disastrous. Fortunately, it can be minimized by producing at the outset of treatment a more gradual destruction of spirochætes, using mercury or small doses of bismuth. Such preliminary treatment should always be used in late syphilis. A satisfactory procedure is to give a six weeks' course of an insoluble bismuth preparation such as bismuth metal, the intramuscular injection being given every five days, using 0.05 gm. for the first two doses and 0.1 gm. at each of the succeeding treatments. Potassium iodide may be given concurrently. For early syphilis this preliminary course is neither necessary nor advisable. The reaction does not recur with subsequent injections.

POST-ARSPHENAMINE DERMATITIS

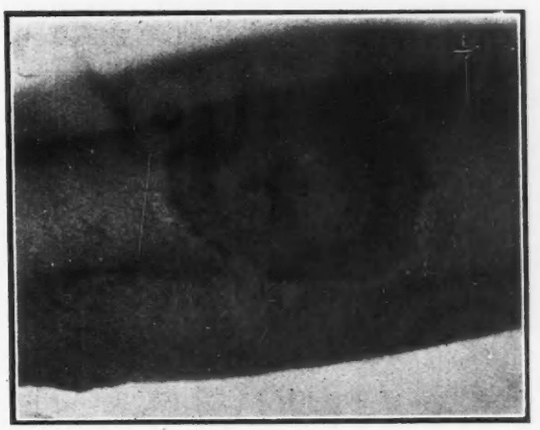
A great variety of toxic manifestations in the skin are associated with the administration of arsphenamine. The mechanism of their production is complicated, but definitely includes (1) the angio-neurotic reaction syndrome, (2) the flare-up of a concurrent infection, and (3) allergy.

Urticaria is a part of the angioneurotic syndrome, occurring often with the nitritoid crisis. It is relieved by adrenalin. Erythematous rashes also occur early, and are thought by Milian to be due to a "flare-up" of a concurrent infectious process. There is fever, and often there are malaise, nausea, and headache. These rashes are ordinarily of no great importance, but if itchiness is a pronounced symptom, great caution should be exercised, as an exfoliative dermatitis may be imminent. Other eruptions leading to exfoliative dermatitis are macular, maculo-papular, erythemato-squamous and vesicular. Itchiness is an important feature here also, which always must be regarded as of serious import. The eruptions may begin insidiously, affecting only the flexures at first, but they rapidly involve the whole body. In the severe cases marked exfoliation sets in, the skin peeling in large sheets. The hair and nails are shed, and there is fever and prostration. Renal involvement may be met with, as shown by albuminuria and hæmaturia. Jaundice may occur. Blood dyscrasias may result from bone-marrow damage or injury to the platelets in the peripheral circulation, and the state of lowered resistance to infection thus engendered paves the way for a serious pyodermia or broncho-pneumonia. Twenty-five per cent of the cases are fatal.

In spite of a few recorded cases of a major dermatitis following a first injection of arsphenamine, the belief is general that susceptibility has an important place in the background of this disease. Once established, this sensitization does not tend to disappear and arsphenamine therapy cannot be resumed. Even minute traces may cause a "flare-up", as in a case reported by Schoch[9] in which a syringe used for bismuth therapy became contaminated with a trace of arsphenamine. Sensitization may also develop in a person handling the drug. Klauder[10] reported a case in which a physician developed a dermatitis and asthma on every local contact with arsphenamine, and recently Vuletic[11] described two such cases, in himself and his assistant. The disturbance began as a mild dermatitis of the fingers, but deep fissures developed later. The assistant developed urticaria and finally acute arsphenamine poisoning. In these cases skin patch tests were positive.

Focal infection also plays a part in the complex on which dermatitis develops. Stokes and Cathcart[12] suggest that allergic instability is due to sensitization by bacterial proteins from a focus of infection, and agree with Milian that the reaction results from a flare-up of the bacterial infection following the temporary lowering of resistance after the arsphenamine treatment.

Another interesting eruption is the fixed eruption. It is similar to that sometimes caused by phenolphthalein or amidopyrin. The lesion illustrated began as a single urticarial wheal, about one-quarter inch in diameter, on the



forearm of a young woman, two hours after her third injection of neo-arsphenamine. It subsided in a few days, leaving a brownish stain. After each subsequent injection, the wheal was a bit larger and in this way the lesion attained a diameter of two and one-half inches after seven injections. Differences in the degree of pigmentation remaining after each subsidence gave the lesion its iris-like appearance. Sections showed the reaction to be mostly in the dermis, and to consist of a marked perivascular infiltration of lymphocytes with a sprinkling of polymorphonuclear leucocytes.

Other rarer eruptions include hyperkeratosis, melanosis, lichen planus, vitiligo, herpes zoster and herpes febrilis.

Treatment of these major dermatitides involves the cessation of administration of the offending drugs and the hospitalization of the

patient. Ten to twenty c.c. of a 10 per cent solution of freshly made sodium thiosulphate should be given daily by the intravenous route. It will be found most effective in the early stages. Calcium thiosulphate, in doses of 5 c.c. of a 10 per cent solution, is said to be valuable, and might be substituted for the sodium salt. The patient should be given a diet of milk and soft foods, and sodium bicarbonate freely administered. A starch bath daily, using two pounds of starch in 30 gallons of water at 100° F., is very soothing. The starch is dissolved in the boiling water and added to the bath. After the bath, the patient is well dusted with talcum powder, or, if there is much desquamation, olive oil may be used. Watery lotions are not comforting, as they tend to increase the chilliness of the patient.

ARSPHENAMINE ENCEPHALITIS

This subject has recently been reviewed by Globus and Ginsburg.[13] It is generally considered that the number of fatal issues caused by involvement of the central nervous system represents about half of the total number of arsphenamine deaths. In the series of reports by Phelps and Washburn,[14] of the United States Navy, covering ten years, 34 deaths followed arsphenamine administration, and of these 20 were attributed to encephalitis. Cole and his associates[15] reported 6 of 12 deaths in the Cleveland clinics as due to hæmorrhagic encephalitis. Encephalitis occurs in all stages of syphilis, is not prevented by preliminary treatment with mercury or bismuth, and usually occurs after the third or fourth intravenous injection. The first symptoms appear in from two hours to several weeks, with an average of two and one-half days, and death occurs on the average in 3 days, with extremes of two hours and seven weeks reported. All the arsenicals have been incriminated, with the exception of tryparsamide; sulpharsphenamine is the worst offender and its use has been given up by some dermatologists. The symptoms and signs in order of frequency are stupor, convulsions, bloody cerebrospinal fluid, vomiting, headache, fever, dizziness, delirium, reflex changes, including Babinski's sign, speech disturbances, tremors. *Post mortem*, various areas of the brain show massive hæmorrhage which, microscopically, is shown to be in reality a collection of numerous pericapillary extravasations, often of the ring type. In view of this, Globus and Ginsburg suggest that the condition should be called pericapillary encephalorrhagia. It has occurred following the use of arsphenamine in a non-syphilitic, and the prognosis is grave. The treatment recommended by Schamberg and Wright[16] is as follows:—

> Any patient who develops (severe) headache should be immediately confined to bed. Spinal puncture should be performed, with the withdrawal of at least 50 c.c. of fluid. Venesection, with withdrawal of 60 to 100 c.c. of blood, should be performed. The bowels should be thoroughly purged, and large doses of bicarbonate of soda should be given. Subcutaneous injections of adrenalin solution (1/1,000) should be given in 5 minim doses every four hours during the day. It is well to employ inhalations of oxygen, inasmuch as there is some reason to believe that an anoxæmia of the brain is associated with this complication.

OTHER NERVOUS SYSTEM REACTIONS

Polyneuritis is a rare complication which follows a large number of injections. It begins with burning and numbness of the hands and feet. These symptoms cease slowly when the drug is stopped. The lesion may progress, causing muscular weakness, wrist and foot drop, loss of deep reflexes and slow anæsthesia. Transverse myelitis, which may be indistinguishable from cord tumour, has occurred, and is due to a Herxheimer reaction in a syphilitic endarteritis of the vessels of the cord.

BLOOD DYSCRASIAS

Blood dyscrasias are fortunately not common, but are very grave. There are three types: (1) Thrombocytopenia, characterized clinically by hæmorrhages from the mucous membranes, and purpura associated with a low platelet count. (2) Granulocytopenia. There is leucopenia, with the granulocytes greatly reduced or absent altogether. There is fever and an angina which may lead to sloughing of the entire buccal mucosa. This is sometimes associated with jaundice or exfoliative dermatitis, and the mortality is high. (3) Aplastic anæmia. More than half the cases reported are of this type. It occurs late and all the elements of the blood are affected. There is bleeding from the mucous membranes, purpura, angina, fever, and great prostration, leading to a fatal issue in less than one month.

The blood dyscrasias are thought to be due to the direct action of arsphenamines on the bone marrow, and there is evidence that they have a destructive effect on the platelets in the

peripheral circulation. In thrombocytopenia, recovery is the rule with or without treatment. The most highly recommended treatment for agranulocytosis is pentose nucleotide K 96* and large doses of bone marrow. For aplastic anæmia repeated blood transfusions, pentose nucleotide, and bone marrow should be given. Resumption of arsphenamine treatment must never be attempted following recovery, as the reaction is certain to recur.

PULMONARY EMBOLISM

Shivers[5] states that there are more than 800 deaths annually in the United States from pulmonary embolism following the use of arsenicals. This estimate seems very high and not in conformity with the experience of most dermatologists. The emboli result from the precipitation of plasma proteins, which occurs when the drug has a pH value below seven. He advises the addition of 0.8 mg. of bromthymol blue to the solution of the arsenical. A green colour indicates a pH above seven, and a yellow colour, a pH value below seven. It is established that arsphenamine, neo-arsphenamine, or sulpharsphenamine, with a pH below seven will precipitate the plasma proteins in rabbit serum *in vivo*, causing pulmonary embolism. If pulmonary embolism occurs, the patient experiences immediately after the injection a sudden severe pain in the chest; breathing is laboured; cyanosis develops, and a state of collapse may occur. In a few hours symptoms of pneumonia will develop in most cases, and the prognosis is not good, the mortality being about 80 per cent. The patient should be given adrenalin at once, and if there is no response in three minutes, shock-combating methods should be instituted. Morphia may be given for the pain. Sodium thiosulphate, one gram in 10 per cent solution, intravenously, has been used with apparent advantage. Oxygen may be indicated. The resulting embolic pneumonia must be treated symptomatically. Jaundice occurs in somewhat less than 1 per cent of the cases treated, but time prevents the inclusion of the subject in this address.

* Manufactured by the Smith, Klein, and French Company, Philadelphia.

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SUBPHRENIC ABSCESS SIMULATING MASSIVE PLEURAL EFFUSION.—H. Harttung describes a case in which a left-sided extraperitoneal subphrenic abscess simulated an empyema, filling the left pleura. A woman aged 48, as a sequel of paranephritic abscess following tuberculosis of the left kidney, had an effusion of pus extending from the lower limit of the thorax to the left clavicle, and displacing the heart and vessels to the right. In the radiogram the shadow of the left half of the diaphragm was invisible, but the fact that the upper subclavicular margin of dullness was convex upwards, corresponding with the left cupola, pointed to subphrenic abscess. The thoracic shadow disappeared after drainage of the abscess through another phlegmonous swelling in the groin; the diaphragm then resumed its normal position. No perforation was seen during inspection of the diaphragm at the attempted operation which followed: the neighbouring granulations were histologically tuberculous.—*Zentralbl. f. Chir.*, July 28, 1934, p. 1750. (Abs. in *Brit. M. J.*)

BACTERIOPHAGE IN THE INJECTION TREATMENT OF CARBUNCLES, AND ALLIED SUPERFICIAL INFECTIONS

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THE discovery of bacteriophage, under the direction of Professor D'Hérelle, has entirely revolutionized the treatment of carbuncles, furuncles and allied superficial infections of the body. Stock bacteriophage is a suspension of ultra-microscopic organisms parasitic to bacteria in a peptone broth. These organisms have been developed with regard to special selective affinity for one specific organism. There are bacteriophage peptone suspensions prepared specifically for the *S. aureus*, *B. coli*, *B. dysenteriæ*, and the cholera bacillus. A pure streptococcus "phage" has not yet been isolated. It is possible, however, to combine and prepare "bacté-pyo-phage", a suspension containing ultra-microscopic organisms, members of which have a specific selectivity. The bacteriophage prepared for staphylococcus infections is known as "bacté-staphy-phage". The mixed phage is known as "bacté-pyo-phage". Bacteriophage may be administered orally or subcutaneously, or by both methods at the same time.

"Bacteriophagy is an infectious disease destructive to bacteria. The agent of this disease is a filterable virus, a protobe, the bacteriophage. When attacked by a bacteriophage having a very high virulence the bacterium is destroyed, but if the attacking bacteriophage is of lower virulence the bacterium is capable of resisting it, and thus acquires a true immunity to its parasite. In brief, when bacteria and bacteriophage are brought together, one of three things will happen in accordance with the conditions present. The bacteriophage may destroy the bacteria; the bacteria may resist and destroy the bacteriophage; or, finally, an equilibrium may become established between the resistance of the bacteria and the virulence of bacteriophage. In this last case both survive and the bacteria contract a chronic disease, that is, a symbiosis is established. Such a state of equilibrium is, indeed, extremely frequent in nature."*

My own personal experience dates from July, 1931, until the present time (November, 1934), both in hospital and private practice. In my opinion the bacteriophage treatment of carbuncles and furuncles has been extremely satisfactory. When considering the treatment of a furuncle, recall the usual operative procedure. The furuncle is incised with a crucial incision, under general or local anæsthesia. The pus is evacuated, and the cavity packed. Eventually the packing is removed and the cavity is re-packed. Gradually the cavity fills up with granulation tissue; then epithelium bridges the gap. Unfortunately, this is a slow and tedious procedure, and in many cases, the infection undermines the skin flaps, necessitating further operative interference. During this period of time the patient is uncomfortable, and may or may not be disabled from work, according to the anatomical position of the furuncle. Further, the person afflicted with a furuncle or carbuncle frequently has a hyperglycæmia which has to be controlled by insulin to promote healing of the wound.

The disadvantages of the surgical procedure are the following. It is painful, takes at least three weeks for the wound to heal and leaves a very disfiguring scar. If, on the other hand, the furuncle or carbuncle is on the the upper lip this treatment is out of the question; a cavernous sinus thrombosis may develop. Under these conditions it is only possible to foment the lip and hope for the best, and possibly ligate the angular vein. It is possible, however, that a furuncle may respond to applications such as hot saline or hot lead and opium. Under such conditions the infection becomes walled off, the furuncle spontaneously

* D'Hérelle, The Bacteriophage and its Clinical Application, C. C. Thomas, Springfield, Ill., 1930, p. 237.

ruptures, and the pus is evacuated. This procedure, however, is uncomfortable, the patient has to stay away from business on account of the repeated hot fomentations, and is generally annoyed. However, even with great care, the infection may spread to the surrounding hair follicles, resulting in a generalized infection.

In my opinion, the use of bacté-staphy-phage for the treatment of carbuncles and furuncles has entirely changed the outlook; it decreases the pain, prevents extension, and considerably shortens the convalescence. The two most important features of bacteriophage are (1) the limitation of extension of the infection, and (2) the healing of the infected area with an almost unnoticeable scar, and in some cases without a scar. As the result of my own experimental work in a very large number of cases, I have adopted the following technique, which depends upon the position, the type of infection, and the amount of induration and fluctuation.

Let us take for instance, the small carbuncle on the back of the neck, which when seen for the first time has three or four areas of suppuration. The hair from the surrounding area is shaved, and well cleansed with petrolic ether, and the carbuncle is examined to find out the extent of induration. Two sterile glass syringes, each of 10 c.c. capacity, fitted with hypodermic needles, are then taken. Into one is aspirated 2 per cent novocaine, or one-half of 1 per cent nupercaine. Into the other syringe is aspirated bacté-staphy-phage, about 8 c.c. The patient is then postured in the left lateral position, and the neck draped with towels. The carbuncle is divided into four quadrants, following imaginary lines. The hypodermic needle is introduced beneath the skin at the junction of the indurated and the non-indurated tissue, and the local anæsthetic injected, subcutaneously, and then into the deeper tissue, until one quadrant is fully anæsthetized. Then the syringe containing the bacteriophage is picked up, the needle is introduced along the circumference of the quadrant, with the needle pointing to the centre of the carbuncle, and the bacteriophage introduced until it bubbles out from one of the orifices. The entire quadrant is infiltrated in this manner. In like manner, the next quadrant is anæsthetized, and injected, and the other quadrants, three and four, until the entire carbuncle is infiltrated with the bacteriophage. On an average, about 4 to 8 c.c. of bacteriophage are required for a carbuncle in which the area of induration is about the size of an English penny. In some patients it is possible to introduce the phage without preliminary local anæsthesia. But this is extremely painful and is not as satisfactory. I have given some patients a hypodermic of morphine, gr. ¼, prior to the injection, but do not consider this advisable for patients in a private office. The injection of a local anæsthetic in the presence of an infection is more or less contradictory to our modern teaching of surgery, unless the anæsthetic can be injected well outside the area of infection. Novocaine and percaine are absorbed exceptionally quickly in the presence of inflammatory exudate. This explains the reason why the carbuncle is anæsthetized and infiltrated in quadrants, rather than attempting to anæsthetize the whole area prior to injection. The attempt to anæsthetize the whole area at one time is entirely unsatisfactory since the local anæsthetic's effect wears away so quickly that the bacteriophage injection becomes painful. After the injection of the bacteriophage the wound is dressed with a dry sterile non-medicated gauze and absorbent cotton. The patient is instructed to report the following day without disturbing the dressing. The following day the same process is repeated, with possibly some increase in the quantity of the bacteriophage by 2 to 4 c.c. The wound is then dressed in the same way after a preliminary swabbing with petrolic ether. It is very usual for the patient to state spontaneously that after the first injection of bacteriophage the neck became freer, less painful, and for the first time in several days, he had been able to sleep. Following the second set of injections, the patient is given the same instructions as on the first day, including the advice to drink copiously of fluids. He returns again on the third day, the dressing is removed, and a large quantity of semi-fluid watery pus comes away with the dressing.

Distinct localized areas of slough are usually seen in the areas through which the pus had been exuding. Any free liquid pus is evacuated by gentle pressure. The wound is swabbed with petrolic ether, and another series of injections carried out as on the first day. The patient is told to report again on the fourth

day, with the instructions not to touch the dressing. On the fourth day, upon removing the dressing, there is a copious quantity of semi-fluid pus, the induration has subsided, and the skin over the indurated area has become wrinkled. The indurated tissues are no longer hard and tender, but are soft, pinkish, and almost painless; the patient moves his neck freely, in all directions without complaint. By gentle pressure, the pus is expelled from the cavity. Little greenish-grey areas of slough are seen in the centre of each of the discharging areas. These are grasped with a pair of sterile forceps. They come away quite easily. The pus left behind is expressed; the orifices ooze blood. This procedure is carried out until all the areas of slough are removed. The wound is swabbed with petrolic ether, and then dressed with a bland non-medicated ointment. It is interesting to note that these patients are able to carry on their daily duties. As a rule, on the 6th to 10th day all the dressings have been removed, and a series of small crusts cover the orifices of the carbuncle.

When bacteriophage is used subcutaneously massive doses should be used for three successive days. If it is injected subcutaneously for four successive days, I have found that numerous patients have suffered from a condition of collapse which resembles protein shock. They become faint, perspire freely, turn pale, and are almost pulseless at the wrist. They collapse, but as a rule recover in about ten minutes. I have found this to take place both in office patients and those confined to bed in hospital. It is possibly due to a protein shock, since the bacteriophage is a suspension in peptone broth. By experimentation I have found that after a lapse of six days it is possible to carry on with subcutaneous injections for another three successive days, and then stop again for a period of six days. This method should be carried out only on carbuncles extending over a large area, where the separation of the slough is retarded. In cases where there is a cavity I have found it useful to pack the cavity with gauze soaked in bacteriophage, especially if there are overhanging

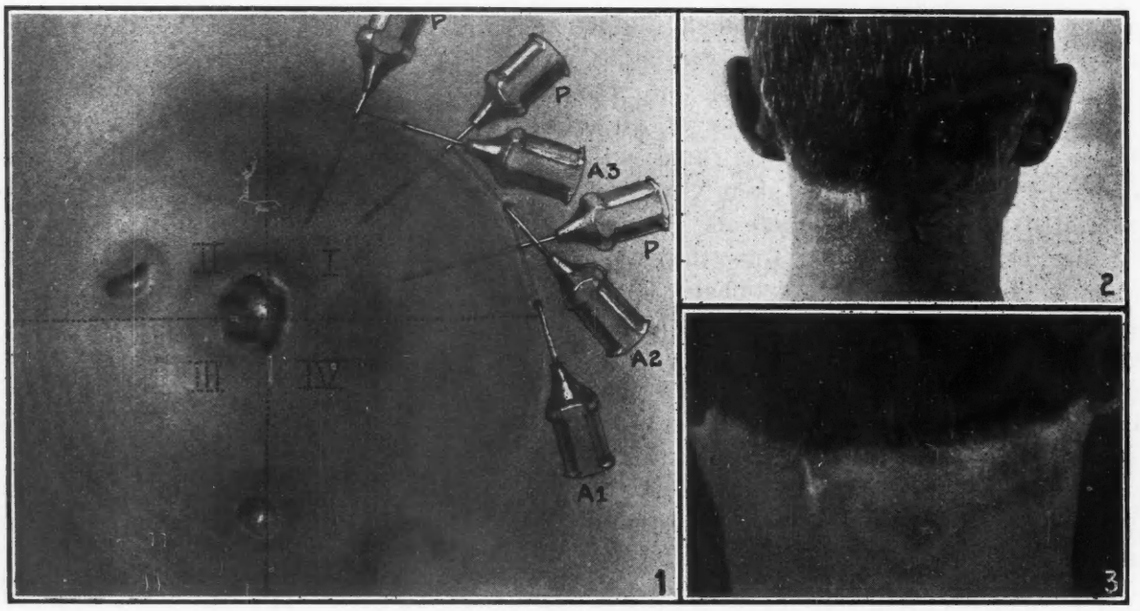

FIG. 1.—Diagram for the injection of carbuncles. The carbuncle is divided into four quadrants. Each quadrant is anæsthetized with a local anæsthetic A_1; A_2; A_3, and injected with bacteriophage P. before carrying on to the successive quadrants. If this procedure is not carried out, but the entire circumference of the carbuncle is injected with the local anæsthetic, the absorption will be so rapid that the anæsthetic effect will disappear before it is possible to inject the circumference of the entire carbuncle with phage.

FIG. 2.—This illustrates the end-result of a carbuncle which extended from the tips of the mastoid processes laterally, and from the external occipital protuberance above, to the 7th cervical spine below. This carbuncle was treated entirely by phage, with a series of seances at an interval of six days. On numerous occasions the cavities were packed with gauze, soaked in bacté-staphy-phage.

FIG. 3.—A patient whose carbuncles had been treated, the one on the left by incision and packing, some four years previously. The carbuncle on the right side was of the same magnitude and was treated entirely by bacteriophage, and, although only about three and one-half weeks old, shows practically no evidence that a disfiguring scar will ensue.

skin edges. I have not found it of any advantage, in fact, it is a great disadvantage, to apply saline or hot boracic hot fomentations when bacteriophage is being used.

In cases of generalized furunculosis, even in some persons who give a history of a large number of boils, bacteriophage has proved much more satisfactory than autogenous vaccines or preparations of tin. The active furuncle is treated in the usual way with bacteriophage, and at the same time the patient is given one ampoule, 2 c.c. in a wineglass of Vichy water half an hour before breakfast for ten days. An interval of two weeks is allowed to lapse, and the patient is given bacteriophage orally for another ten days. In the majority of cases, the results have been excellent. The furunculosis has cleared and has failed to recur for a period of at least eighteen months. Furunculosis on the back and buttocks responds admirably to bacteriophage treatment.

The most striking example of the distinct advantage of bacteriophage therapy is seen in its application to suppurative lesions in the axilla, which are so common during the warmer seasons. It is well understood from the surgical point of view that suppurative lesions of the axilla are very painful, respond badly to surgical interference, and that the infection extends rapidly to the surrounding hair follicles. Treatment by hot fomentations is awkward, painful, and exaggerates the condition. If the infected areas are incised and packed under gas-oxygen anæsthesia they are extremely painful and tend to extend under the skin flaps, or result in a low-grade chronic inflammation, which leaves a hard, reddened, tender mass. In other words, surgical intervention has never been found entirely satisfactory in axillary infections. The principle applied in the application of bacteriophage in axillary infections is as follows. The surrounding hair follicles are protected by 5 per cent ammoniated mercury ointment, and then hot saline fomentations are applied, *until the indurated areas become fluctuant.* The entire axilla is then swabbed clean with petrolic ether, and 2 per cent novocaine is then injected with a hypodermic needle into the normal skin to the edge of the fluctuant area. A large-bore blood needle connected to a syringe is then inserted through the anæsthetized area into the pus pocket. The free pus is aspirated, the syringe removed, leaving the needle *in situ.* A syringe containing 2 c.c. of bacté-staphy-phage is attached to the needle *in situ,* and the cavity is washed out with the bacteriophage solution. The needle is then withdrawn and a dry dressing applied. The following day the procedure is repeated, and, if need be, on the third day. By the third day the greater part of the induration has subsided and semi-fluid pus is draining from the aspiration aperture. The treatment is then completed, and, as a rule, the inflammatory reaction subsides, and, by the end of ten days, with no evidence of any pre-existing infection. These principles are applied to any fluctuant area or broken-down gland. Here again is the advantage that the infection ceases to spread after an introduction of the bacteriophage, and that the condition is cleared up without scar formation.

Carbuncles of the upper lip are always looked upon as extremely dangerous, since, if they are interfered with, the infection rapidly spreads along the course of the angular vein to the orbit, producing a sinus thrombosis, and eventually death. Carbuncles of the upper lip should never be incised, or a cavernous thrombosis will develop. Heretofore they have always been treated by repeated applications of hot saline with the patient in hospital. Bacteriophage injected subcutaneously at the junction of the normal and the indurated tissue has made a great change in the prognosis of this condition. These cases respond admirably, the œdema subsides, and infection fails to spread along the course of the angular vein. Furunculosis of the chin also responds admirably to phage treatment, the end-result being without scar.

Factory helpers develop a chronic olecranon bursitis. In many instances the bursa becomes infected, usually with staphylococcus. If these cases are not handled satisfactorily an osteitis of the olecranon develops, with the formation of a chronic sinus. Even if these cases are treated by incision, then packing, the period of convalescence, and the formation of a healed scar is about three to six weeks. In my experience, infected olecranon bursæ should be aspirated and lavaged with bacteriophage. Numerous cases treated by this method have all responded well and ended without a chronic sinus in about ten days to two weeks.

In the case of an acute infective arthritis, with pus under tension, the treatment heretofore has been complete rest of the joint by means of a suspension and traction, and repeated aspiration under aseptic conditions. In cases where the organism has been isolated, satisfactory results have been obtained by first aspiration of the joint, and then lavaging it with bacteriophage.

Paronychia, a disabling condition of the fingers or toes, responds admirably to local instillations of bacté-staphy-phage.

The indolent, brawny, indurated areas which develop periodically in cases of chronic osteomyelitis with sinus formation are rapidly liquefied, with rapid evacuation of a watery pus, if bacté-staphy-phage is given orally. One patient who had multiple areas of bony involvement, dating back nine years, periodically gets a brawny indurated area just above the right clavicle. The entire scapula and shoulder joint are involved. The operative removal of small sequestra is out of the question. When an area of induration manifests itself, the patient asks for a prescription for "bug medicine", as he calls it. The bacté-staphy-phage is taken orally. On the fourth to fifth day after starting the treatment the indurated area liquefies and discharges watery pus copiously. The sinus heals up in about three weeks and the patient disappears for nine to fourteen months.

The conditions so far discussed deal principally with infections by *S. aureus*. I come now to the consideration of infections by the colon bacillus, such as acute ischio-rectal abscess, colon infections in post-operative wounds, and those associated with a perforated gangrenous appendix. I have had two cases of ischio-rectal abscess, which were admitted to the ward, pointing and ready for incision. Both were aspirated and injected with coli-phage, shortening the convalescence to about one-third of the time required by the ordinary methods of treatment, such as packing and hot fomentations. The value of the application of coli-phage to the peritoneal cavity in cases of perforated gangrenous appendix is somewhat doubtful. I do not believe that the procedure is of much use, unless a drain of the old hard rubber type be inserted and phage dropped into the tube daily. In my experience, one application of phage is not sufficient; therefore, I do not recommend the use of coli-phage in the abdominal cavity when closure has to be made without drainage.

Bed sores unfortunately develop over the sacrum in old debilitated subjects, confined to bed. They are foul, have undermined edges, and contain sloughs. The organism is, usually, of the colon group. Repeated packing with coli-phage will give excellent results.

A specific bacteriophage for the streptococcus group of organisms has not yet been satisfactorily prepared. There is, however, the bacté-pyo-phage, which is a composite mixture of phages for the pus-forming organisms. This includes some of the streptococcus group. I have not had much experience with it, except in one case in which a streptococcus infection of the entire left side of the face developed following an accident. Extending over a period of about twenty-four days, the patient had three distinct exacerbations of his infection. He was treated by applications of hot lead and opium. Finally, two small areas became localized, which developed fluctuation, each cavity containing 2 c.c. of pus. The organism was a hæmolytic streptococcus. The pus was aspirated and the cavity washed out with bacté-pyo-phage. This was done for two successive days. The condition immediately subsided, and within a week from the time of the first injection the temperature fell to normal and remained so. The entire condition cleared up without scarring of the face, except for a slight dimpling over the left cheek, corresponding to the position of the small localized abscess.

I have had no experience with the rhino-phage as applied to nasal conditions.

To repeat, bacteriophage treatment of furuncles and carbuncles is most satisfactory. The injections for three successive days are somewhat painful; the relief of tension, however, is remarkable. The œdema subsides, the temperature falls, and the patient readily acquires the feeling of well-being. Further, the convalescence is much shorter than with the surgical procedure, and healing is without scar formation. Irrespective of a hyperglycæmia, the condition clears without the administration of insulin. Massage, which was necessary for extensive carbuncles, is hardly required. Cases of multiple furunculosis respond admirably to subcutaneous and oral bacté-staphy-phage. The results are very striking, as compared to those

of autogenous vaccines or stannoxyl. In cases of staphylococcus septicæmia, I am of the opinion, however, that the staphylococcus toxoid is far superior.

Let me recall the treatment of the furuncle. Inject an adequate amount of bacteriophage daily for three successive days. Do not inject on the fourth day, otherwise you will have a collapsed patient on your hands. If the three seances of injections are not sufficient, wait for an interval of six days, and then give another treatment of three seances. Further, the application of disinfectants or antiseptics, even alcohol, will destroy the phage organisms. Syringes and needles used for injections should be boiled and not sterilized in alcohol or carbolic preparations.

May I suggest that in the case of a carbuncle over three cm. in diameter, when convenient, you submit the patient to chloroform analgesia rather than local infiltration with novocaine. This procedure, of course, must be carried out in bed. I have found that it works admirably in nervous persons who are suffering from toxic absorption. After the injection of bacteriophage simply apply a dry dressing. All fomentations are discontinued and all ointments. When all the slough is separated and a clean granulating base only remains, it is then, and only then, advisable to butter the wound with 2½ per cent ammoniated mercury ointment.

I am indebted to the Anglo-French Drug Company, for an unlimited supply of bacteriophage and for information as to carrying on this work.

THE CLINICAL DIAGNOSIS OF ARTERIOSCLEROSIS AND HYPERTENSION*

BY DUNCAN GRAHAM,

Toronto

MORTALITY statistics indicate that the death rate from heart disease is greater now than it was fifty years ago. During the present century heart disease has not only replaced tuberculosis as the most common cause of death but the number of deaths from heart disease is now greater than the combined death rate from tuberculosis and cancer. This increasing incidence of heart disease is occurring among persons of over forty years of age. After middle life the primary cause of heart disease, in the vast majority of cases, is disease of the coronary arteries, due to arteriosclerosis, or to hypertension, or to both. To these two conditions must be attributed the increasing death rate from heart disease. For the purpose of this symposium on cardiovascular disease I will confine my remarks to the clinical diagnosis of arteriosclerosis and hypertension.

A common clinical diagnosis is generalized arteriosclerosis, yet how seldom do the pathological findings after death justify the clinical diagnosis? Why this lack of correlation between the clinical and pathological findings? It is chiefly due to the fact that arteriosclerosis is considered to be a generalized process affecting all the arteries of the body. If the clinician finds thickening, beading, or tortuosity of the radial and brachial arteries of the arms he too often concludes that arteries supplying other parts of the body are similarly affected. This is far from being the case, necessarily. From the standpoint of the clinician, arteriosclerosis of a degree to cause impairment of function is almost always a process localized to the arteries supplying one or more parts of the body, chiefly the heart, brain, limbs, kidney and pancreas. If one excludes minor and insignificant changes in the vessels, arteriosclerosis from the standpoint of the pathologist is much more commonly a localized than a generalized finding. If one excludes the palpable peripheral arteries, the clinical diagnosis of arteriosclerosis must be based on disturbances of function occurring in one or more organs or systems of the body.

How can we, as clinicians, diagnose these disturbances of function as signs and symptoms due to arteriosclerosis? The problem is indeed often a difficult one, but never more important

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than it is today. It is well recognized that the clinical manifestations of arteriosclerosis are essentially the result of a disturbance in the circulation of the blood, that is, the effect of an inadequate supply of blood to parts of the body distal to the sclerosed arteries. In other words, they are the result of nutritional disturbances in the tissues affected. As a greater supply of blood is required by the heart and the skeletal muscles during exercise, by the abdominal viscera during digestion, and by the brain during mental work and worry, the appearance of signs and symptoms first following periods of increased physical or mental activity rather than of rest is explained, and the more serious significance of symptoms occurring during rest can be appreciated.

Although the arteriosclerotic process may affect all parts of the body, it is important to remember that the lesions are not all the same in their origin, in their character, in their incidence in different parts of the arterial system, or in their effects on the blood supply to the body tissues distal to the site of the lesions. In the large elastic arteries, like the aorta and its main branches, the primary lesion is in the intima and develops secondarily in the media. The ultimate result is a loss of elasticity with dilatation and lengthening of these arteries, more particularly the ascending aorta. The bases of the aortic valves may be involved in the process, resulting in aortic regurgitation. In the thoracic aorta, dilatation and lengthening may be found on physical examination, but is more accurately determined by x-ray examination under the screen. In the medium-sized muscular arteries of the extremities, the primary lesion is a degeneration and calcification of the media, with intimal changes occurring later. These medial changes cause loss of elasticity and dilatation and lengthening of the larger peripheral arteries, but no obstruction to the flow of blood. Normally, the elastic aorta dilates with each ventricular output of the heart, and its elastic recoil serves to maintain a continuous flow of blood to the capillary system with the least amount of work on the heart. This impairment of the elasticity of the aorta, more particularly the ascending portion, by increasing the work of the heart, constitutes the chief disturbance produced by arteriosclerosis of the aorta. Unless the arteriosclerotic process extends to the aortic valve, causing aortic regurgitation, or is complicated by a syphilitic aortitis which may involve the aortic commissure or the mouths of the coronaries, the effect on the heart produces no serious circulatory disturbances. Sclerotic changes in the medium-sized muscular arteries chiefly affect the elasticity of these vessels, but this is of lesser significance than in the aorta. The importance that has been attached to the physical examination of the peripheral arteries in the clinical diagnosis of arteriosclerosis is out of proportion to the clinical significance of the findings. Advanced tortuosity and beading of the arteries of the arms may be present with little or no evidence of circulatory disturbance in the hands.

It is the sclerotic changes occurring in the small muscular arteries down to the arterioles that are the chief cause of disturbances in bodily function from arteriosclerosis. However, one must attempt to differentiate clinically two groups of cases, one with sclerosis of the smallest arteries and arterioles, that is arteriolar sclerosis, from sclerosis chiefly affecting the small proximal arteries. Arteriolar sclerosis is found in chronic nephritis and in many cases of hypertension without renal insufficiency. This type will be discussed later under hypertension.

In the smaller muscular arteries, such as the digital arteries of the limbs, the main branches of the coronaries, of the renal arteries and of the main cerebral arteries, the gradual thickening of the intima from sclerosis, which is the primary lesion in arteriosclerosis, leads to a partial occlusion of the lumen of the vessel resulting in progressive nutritional changes in the tissues supplied by these vessels. In the limbs the skin loses its elasticity and atrophy may occur; intermittent claudication of the calves of the legs, developing with exercise, or changes in colour and temperature of the hands and feet may be present. Finally, as a result of trauma or infection, or both, thrombosis may develop and gangrene result. In younger diabetics, gangrene may develop in the toes or feet without a preceding loss of elasticity or atrophy of the skin. This is to be accounted for by the age of the patient and the more rapid development of arteriosclerosis in untreated diabetics. When signs and symptoms of the type just described occur in the limbs, arteriosclerosis of the smaller, rather than of

the medium-sized palpable, arteries of the limbs, is the cause of the disturbances present. In this connection it should be remembered that thromboangiitis obliterans of the medium-sized arteries may produce intermittent claudication, changes in temperature and colour of the limbs, and gangrene, and must be differentiated from arteriosclerosis.

Sclerosis of the main branches of the renal artery leads to atrophy of the kidney, commonly spoken of as the senile, atrophic, or true arteriosclerotic kidney. The atrophy is seldom, if ever, severe enough to produce signs of renal insufficiency. In older patients the presence of albumin and casts in the urine is more often due to passive congestion of the kidney from cardiac insufficiency than to the effects of sclerosis of the main renal artery itself.

In the main branches of the coronary arteries, the primary lesion is again a thickening of the intima, commonly of a nodular character, causing a partial occlusion. If the process affects all the main branches of the coronaries the nutritional effects on the heart muscle are diffuse in character and result in a moderate hypertrophy which frequently terminates in cardiac insufficiency, with or without congestive signs of failure. In other cases a more marked occlusion of one branch may develop, with or without thrombosis, causing a sudden and local nutritional disturbance in the heart muscle. The former are classified as degenerative heart disease or chronic degenerative myocarditis; the latter, as coronary thrombosis or cardiac infarction. In both groups arteriosclerosis of the main branches of the coronary arteries is the underlying cause of the cardiac disturbance. Occlusion of the mouths of the coronaries from syphilitic aortitis may produce similar effects in the heart, but this aspect of coronary disease is not included in this discussion, as syphilis is not a cause of arteriosclerosis.

Sclerosis of the main cerebral arteries is of a type similar to that of the main branches of the coronary arteries. The narrowing of the lumen of the arteries from intimal thickening results in an impairment of the circulation and a slow and progressive impairment in cerebral function. Loss of energy, decreased intellectual capacity, failing memory, emotional instability are present, and in the later stages childishness or dementia may develop. Focal signs of disturbed circulation may appear, either transient or permanent in character, such as weakness of a limb or limbs on one side, or aphasia. Occlusion of the arteries, with or without thrombosis, rather than hæmorrhage, is the cause of these signs in this form of cerebral arteriosclerosis, which Allbutt has referred to as "decrescent arteriosclerosis".

Many years ago Allbutt called attention to the existence of high blood pressure in patients showing no signs of renal insufficiency. He stressed the importance of differentiating cases of arteriosclerosis with high blood pressure from those with normal or low blood pressure. The later experiences of others have amply confirmed his observations. It is now generally agreed that persistent high blood pressure is not caused by arteriosclerosis, but that sclerosis of the smallest arteries and arterioles may be the result of increased blood pressure. To this type of high blood pressure Allbutt gave the name "hyperpiesia". This condition, more commonly referred to by us as "essential hypertension", is an important causative factor in the development of heart disease after forty years of age. The primary cause of the raised blood pressure is considered to be an increased tonicity of the arterioles. As the diastolic pressure is a measure of the peripheral resistance of the arterioles, the raised diastolic pressure found in essential hypertension supports the contention that increased tonicity of the arterioles is the primary cause of hypertension.

In the early stages of essential hypertension, the rise in blood pressure is probably temporary, later becoming persistently high, with further temporary increases from influences that normally cause increases in the blood pressure, for example, exercise and emotional disturbances. Less frequently, acute attacks of hypertension may occur. This type often runs a rapid and fatal course, but, occasionally, may be followed by a remission. In the toxæmias of pregnancy and in eclampsia the blood pressure may be elevated and fall with the emptying of the uterus. In the more chronic form of essential hypertension a fall in a persistently high blood pressure usually follows the development of cardiac insufficiency, but here the diastolic pressure tends to remain elevated. The finding of a persistent diastolic pressure of 100 mm. of Hg. or over in a case of cardiac insufficiency is suggestive of a preëxisting hypertension.

No pathological changes are found in the arteries in the early stage of essential hypertension. With the development of a persistent high blood pressure hypertrophy of the muscular coat of the arterioles, of the small and medium-sized arteries, and of the left ventricle of the heart occurs. The radial and brachial arteries are palpably thickened. Tortuosity may be present, but only in the more advanced stages of the disease. Beading of the radial artery from medial degeneration due to arteriosclerosis, so commonly found among elderly people, is usually absent. When present with hypertension it is found in older persons, which finding suggests that the hypertension has developed after the medial degeneration. Hypertrophy of the media in hypertension is followed by intimal thickening of the smallest arteries and arterioles, causing narrowing of the lumen of the vessel. Later, degenerative and fibrotic changes in the media may develop. In a small percentage of cases necrosis of the arterioles occurs, causing acute focal changes in the tissues affected. This acute vascular disturbance is found in "malignant hypertension", which is probably an acute form or an acute phase of essential hypertension.

Increased tonicity of the arterioles, followed by hypertrophy of the muscular arteries, thickening of the intima, and, later, medial degeneration and fibrosis, with the less frequent occurrence of necrosis of the arterioles, represent the functional and structural changes occurring in the arterial system in essential hypertension. The structural changes causing the circulatory disturbances have their origin in the arterioles and the smallest arteries—an arteriolar sclerosis. As found in arteriosclerosis, the lesions in arteriolar sclerosis are more marked in certain parts of the body, chiefly the internal organs—kidney, pancreas, spleen, liver, eye, brain, heart and gastrointestinal tract. Although most observers deny the occurrence or development of a similar process in the arterioles and smallest arteries of the skeletal muscles, Keith and his associates have found similar changes in these vessels. In any case, one seems justified in concluding that the clinical manifestations of essential hypertension are due, first to a functional and, later, to both a functional and a structural disturbance of the smallest arteries and arterioles of the body.

In the examination of patients the discovery of an increased blood pressure, more especially a high diastolic pressure, is a sign, like fever or anæmia, requiring special attention on the part of the clinician. While it is a common and justifiable practice to classify all cases with a systolic pressure of over 160 mm. Hg. as hypertension, it is important to differentiate cases with a raised systolic pressure and little or no elevation of the diastolic from those with a diastolic pressure of 100 mm. Hg. or over. To the latter group belong cases of essential hypertension, bilateral kidney disease with renal insufficiency, certain cases of increased intracranial pressure from brain tumour, and rare cases of suprarenal tumour. To the former group belong cases of arteriosclerosis with a moderate increase in systolic pressure and a normal or subnormal diastolic pressure, cases with hyperthyroidism, and cases of free aortic regurgitation. In these last two conditions one finds a dilatation of the arterioles, rather than a constriction as in essential hypertension.

In essential hypertension a diastolic pressure of 100 mm. Hg., or over, and a systolic pressure of 180 mm. Hg., and over, is the usual finding. It is often discovered in the course of an examination for life insurance. Although certain patients may have a high pressure of this type for years without the development of functional disturbances, one should not belittle the significance of hypertension, especially in a younger individual. In the vast majority of cases essential hypertension eventually results in disturbances of function chiefly relating to the heart, the brain, the eye, less frequently the kidney, and rarely other organs of the body. The condition may develop in people under forty years of age, but is most common in the fifth decade of life, with the majority of deaths occurring in the sixth decade. Heredity would seem to play a part in the development of this condition. A family history of hypertension or early death from vascular disease is common. The exaggerated vasomotor responses of those with hypertension suggest a hypersensitive sympathetic nervous system or an abnormal response of the arterioles to vasoconstrictive influences. With the development of persistent high pressure the same stimuli cause further temporary increases in pressure and the appearance of new symptoms, or the exaggeration of previous symptoms chiefly relating to the heart and brain.

Following a period of persistent high blood pressure, enlargement of the heart from hypertrophy of the left ventricle is the next most constant clinical finding, and may be present for long periods before other symptoms develop. Later, palpitation, shortness of breath on exertion, and loss of energy develop. Still later, attacks of cardiac asthma and cardiac insufficiency, with congestive signs of failure, occur in the majority of cases. Anginal pains and attacks of coronary thrombosis may develop in hypertensive heart disease, but the cause of these is probably related more to the commonly associated arteriosclerosis of the main coronary arteries rather than to the functional and structural disturbances in the smaller muscular branches and arterioles of these vessels.

The early cerebral manifestations of essential hypertension are increased irritability, and throbbing or fullness in the head. Later, mental fatigue, lack of concentrating power, sleeplessness, headache, transient attacks of mental confusion, aphasia, numbness or tingling in the extremities, or even hemiplegia may develop. These transient attacks are usually followed by a major attack of cerebral hæmorrhage. Many attribute these minor cerebral attacks to spasm of the arteries, causing temporary ischæmia; others attribute both the major attacks, which are often fatal, and the minor transient cerebral disturbances to hæmorrhages, the latter being due to small capillary hæmorrhages. Whether or not spasm or hæmorrhage is the primary cause of these transient attacks, they are manifestations of circulatory disturbances of vascular origin related to the smallest arteries and arterioles rather than to the larger-sized cerebral arteries.

In view of the generally accepted site of the vascular disturbances in essential hypertension it is not surprising that the ophthalmoscopic examination of the eye grounds should yield valuable information in the diagnosis of essential hypertension. In the stage of increased tonicity of the arterioles, the arteries are usually narrower than normal. As changes develop in the media the arterial light reflex becomes widened; with the development of intimal changes the retina shows the effect of the circulatory disturbances produced, such as, œdema and white areas of degeneration. The association of these changes in the retinal vessels and the retina with persistent high blood pressure and the cardiac and circulatory manifestations just described are of very great help in diagnosis, and the examination of the eye-grounds should be a part of the routine examination of all patients.

One of the most difficult problems is the differential diagnosis of chronic glomerulo-nephritis and essential hypertension. In the majority of cases of chronic glomerulo-nephritis there is a persistently high blood pressure, with an increased diastolic pressure and some hypertrophy of the heart. The arteries involved are of the same size as in essential hypertension, and the lesions are not confined to the kidney but arteries in other parts of the body are affected, such as the retinal vessels. Eye-ground changes closely simulating those found in hypertension may be present. In addition, a small percentage of patients with essential hypertension may develop signs of renal insufficiency and die from this condition. As a first step in differential diagnosis it is important to separate cases of hypertension into two groups, one with, and one without, signs of renal insufficiency. For this purpose a study of the specific gravities of two-hourly specimens of urine is the most useful, as both cardiac insufficiency and nephritis may be the cause of albuminuria. In cardiac insufficiency with passive congestion of the kidney the highest specific gravity of the urine is usually over 1020, whereas in renal insufficiency the highest specific gravity is usually below 1020 and tends to be fixed, that is, shows little or no variation in the different samples of urine. If the specific gravity is below 1020 and tends to be fixed one is justified in diagnosing renal insufficiency. A history of nocturia is suggestive of renal insufficiency. If signs of renal insufficiency are present one must attempt to decide if the case is one of primary hypertension with secondary renal insufficiency, or one of chronic glomerulo-nephritis with secondary hypertension. In chronic nephritis the systolic and diastolic pressures are seldom so high as in essential hypertension, and are more fixed. Temporary increases from emotional disturbances, so characteristic in essential hypertension, are uncommon. The age of the patient is of importance. Chronic nephritis most commonly occurs before forty; essential hypertension is most common after the fortieth year. With these points in mind, it is usually

possible to differentiate cases of primary hypertension with secondary renal insufficiency from those of primary renal disease with secondary hypertension.

Many patients with essential hypertension present signs and symptoms indicating disturbance of function of more than one organ or system of the body, for example, cardio-cerebral, cardio-renal, or a combination of these. From the standpoint of prognosis and treatment it is important to determine, if possible, the system first showing symptoms and the one chiefly responsible for the patient's disability. In a series of 100 cases of essential hypertension studied recently, major symptoms of cardiac origin appeared first in 62 per cent of the cases. A major cerebral accident, most often hæmorrhage, was the cause of death in 47 per cent; cardiac insufficiency in 37 per cent; renal insufficiency in 5 per cent, and intercurrent infection, etc., in 11 per cent. In 23 per cent of the cases signs of renal insufficiency, such as polyuria and fixation of specific gravity of the urine, were present, but in only 5 per cent was renal insufficiency the primary cause of death. These results are in general agreement with those of other investigators in showing that the first major symptoms are usually related to the heart and that the chief causes of death are cardiac or cerebral in origin. In a pathological study of 420 cases of primary hypertension, Bell and Clawson concluded that 60 per cent of the cases died of cardiac disease, 20 per cent of cerebral disturbances, and less than 10 per cent of renal insufficiency.

As essential hypertension develops most frequently after forty years of age, arteriosclerosis of the main coronary arteries is a common accompaniment. In patients developing cardiac disturbances after middle life, both of these conditions must be considered as possible causative factors. The persistent high blood pressure not only increases the work of the heart, but likely accelerates the development of the arteriosclerotic process. The arteriolar disturbances associated with the hypertension and the arteriosclerosis of the main coronary vessels both contribute to nutritional disturbances affecting the heart muscle. Essential hypertension, therefore, is not only an important cause of heart disease after forty years of age, but constitutes an aggravating factor in the development of heart disease due primarily to arteriosclerosis of the main coronary arteries.

To sum up. Arteriosclerosis may affect all the arteries of the body, but the cause of the disturbance of function is more often a localized than a generalized process. A clinical diagnosis of generalized arteriosclerosis can seldom be justified. Arteriosclerosis of the small, rather than the large and medium-sized, arteries is the important cause of the resulting circulatory disturbances. The clinical significance attached to palpable sclerosis of the peripheral arteries has been overestimated. Visible nutritional or circulatory disturbances present in the limbs are of greater importance in diagnosis. The clinical diagnosis of arteriosclerosis should be based on the presence of signs and symptoms indicating disturbed function, chiefly of the heart, brain, limbs and pancreas, developing after forty years of age. Arteriosclerosis is not a cause of high blood pressure, but may be the result of it. A persistently high systolic and diastolic pressure of unknown origin is a symptom of a definite disease—essential hypertension. The most common cause of disabilities occurring after forty years of age is vascular disease due to arteriosclerosis, or to essential hypertension, or to both. Occurring alone or as associated conditions, they are responsible for the increased incidence of heart disease.

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THE CLINICAL MANIFESTATIONS OF CORONARY DISEASE*

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IN the medical world today coronary disease is very much in the limelight. In the last sixty-five years deaths from cardio-vascular diseases have increased approximately 700 per cent. While this is true, its significance is not so serious as would appear at first sight. A very large part of the increase is due to the decline in the number of deaths in early years from acute infections and from various other causes of infant mortality, which enables more people to reach the sclerotic age. The fear of coronary sclerosis and its complications is considerably exaggerated at the present time, and it is not increasing so fast as many of us may be inclined to think. In Ontario heart disease does not become the chief cause of death until after sixty. Three-quarters of our cardiac deaths occur after sixty, and half of them occur after seventy years of age. Recently, Cohn, of the Rockefeller Institute, investigated carefully the question as to whether or not coronary disease is on an increase. After a great deal of study, he concluded that it is on the increase, but that the increment is really slight; that much of the apparent increase was due to altered terminology in registration, and to the fact that many more people reach sixty. He brought out an additional interesting reason for this fact, namely, that many fewer deaths occur in the advanced ages from infectious diseases. Thus, not only does the decline in infectious diseases lessen the death rate in the young, but it also continues to lessen the death rate in the very decades when coronary deaths are so prevalent.

During the last month or two we have been looking over the records of autopsies from coronary disease in the Toronto General Hospital, for the last eight years, in order to check up and improve the accuracy of our diagnosis. During this period, there were 3,240 post-mortem examinations, of which only 156 cases received a pathological diagnosis of coronary disease, constituting 4.8 per cent of all autopsies. This appears to be a very small figure. During the last three years, when perhaps special pathological and clinical interest effected more careful examination of the coronaries, out of 1,265 autopsies 92, or 7.3 per cent, received a pathological diagnosis of coronary sclerosis.

Clinically, coronary disease manifests itself in three different ways. Most commonly, it is to be suspected when a person in the middle or last third of life has his exercise tolerance limited by shortness of breath or uncomfortable palpitation. These symptoms increase and the patient gradually develops either œdema of the lungs from a failing left ventricle, or œdema of the legs and enlargement of the liver from a failing right ventricle, or a combination of the two, with general œdema. Such cases we diagnose as chronic degenerative myocarditis. The second largest group is made up of cases of cardiac infarction, that is usually called coronary thrombosis. In these cases, what we are really diagnosing is cardiac infarction, because infarction is not always caused by thrombosis; it is frequently caused by partial coronary obstruction from atheromatous or other sclerotic change. The third group is called angina pectoris. This might be defined as a limitation of one's ability to undertake exertion by distress in the cardiac area, or pain, which is most commonly substernal. In 1933, in the Toronto General Hospital, 480 cases were diagnosed as chronic degenerative myocarditis, 75 as coronary thrombosis, and 51 as angina pectoris. A very considerable percentage of the cases of coronary thrombosis, however, would also have angina; that is, effort pain, either before or after the attack of coronary occlusion. These figures exaggerate the proportion of degenerative myocarditis in relation to the cases with pain, because the 480 cases must include many people whose underlying disease was obscure and who came into the hospital dying a cardiac death as a termination of some

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obscure disease, such as undiagnosed cancer. In office practice the proportion is different; the proportion of cases with pain is much higher. During the last year, among the office patients, 69 cases have been diagnosed as chronic degenerative myocarditis, 64 as coronary thrombosis, and 56 as angina. The relative frequency of degenerative myocarditis in office practice is actually too small, because the popular fear of angina and coronary thrombosis drives patients to consult physicians earlier and more frequently than does shortness of breath. Thus, one of the most significant points to be realized in connection with coronary disease is that it shows itself chiefly by the symptoms of a gradually failing heart, rather than by angina or coronary occlusion. Also, it will be shown later that cases of degenerative myocarditis are, if anything, more serious than cases of angina, because the average length of life after the onset of shortness of breath on exertion is shorter than the average length of life after the onset of angina.

The last 90 autopsy cases of coronary arterial or arteriolar disease were analyzed carefully, in order to correlate clinical and pathological findings. Of these 40, or 44.4 per cent, had coronary thrombosis; 19, or 21.1 per cent, had infarction of the heart without thrombosis; 31, or 34.4 per cent, had coronary disease without thrombosis or cardiac pain. The remaining 14 were analyzed carefully to find out why coronary occlusion was not diagnosed. One of these cases had a clear history of coronary thrombosis and the diagnosis should have been made. One had a history of angina, but no history of any attack of prolonged pain. One had no cardiac symptoms whatever. One had an attack of pain lasting two hours, which came on walking, nine weeks previously to death. He was admitted to the hospital nine weeks after his attack of pain, with marked failure, and died suddenly two days later. No electrocardiogram was taken. Coronary thrombosis should have been suspected. Three had an indefinite history of pain, not typical of angina or coronary thrombosis. The remainder (seven) had no history of pain at all, or symptoms of any attack which would make one suspicious of coronary thrombosis.

Of these 14 undiagnosed cases, 1 was a case of asthma who died of cellulitis of the face, and had an old healed infarct resulting from an artery not completely occluded. Two were cases of hemiplegia. The first of these worked up until six days before admission to hospital, having been found unconscious with a hemiplegia. The second case of hemiplegia had had a stroke two days previously to admission, had lues, and died in an attack of dyspnœa lasting fifteen minutes. The remaining 11 were cases of failing hearts with œdema and passive congestion, mostly without pain, as mentioned previously. The only way a diagnosis of cardiac infarction could possibly have been made would have been by repeated electrocardiograms, and the diagnosis could have been made in the majority of these, by this means. We are attempting to overcome this difficulty now by taking weekly electrocardiograms on the cases of chronic degenerative myocarditis with chronic insufficiency that are in the cardiac ward. There will always, however, be odd cases scattered throughout the hospital who die with unrecognized coronary occlusion, with atypical symptoms or with no symptoms.

Of the 26 diagnosed cases of coronary thrombosis, an analysis shows the following facts. All were male but one. Only 8 had no history of previous cardiac disease. Ten had previously had angina, and 18 had previously had either angina or serious dyspnœa on exertion. Three had no pain in the attack. Eleven had high blood pressure. Only 10 had a sudden onset. The remaining 16 had a slow, gradual onset, of from one week to several months of pains, some of an indefinite nature, and some definitely in response to effort. In only 4 was the pain epigastric, and in all of these four it extended up over the chest.

The third group, namely, the 19 cases which at autopsy were found to have either fresh or healed infarction, or both, will now be analyzed. Eight of these had recent infarction, and in half of them there was nothing whatever in the history to suggest coronary occlusion or cardiac infarction. Two were diagnosed as coronary thrombosis, and 2 had a suggestive history of coronary thrombosis, but the diagnosis was not made. It might have been suggested, but it could not have been proved. One patient had hemiplegia with gangrene of the feet and died instantly without cardiac symptoms. The other was a woman who had had dyspnœa and cardiac insufficiency, gradually increasing for

ten years, and was admitted moribund and died shortly, without any history being obtained. The remaining 11 of this group had healed infarcts, for about half of which there was no previous history.

In order to get a true picture of the clinical manifestations of cardiac infarction (recent), all such cases should be grouped together. Of the 90 autopsy cases of coronary disease, 48 were found to have recent infarction, and in 8 of these no thrombosis was found to cause the infarction. Of these 48 cases, 12 had no previous history of cardiac disease; 13 had had angina; 36 had had either angina or dyspnœa on exertion previously. The most important clinical fact, however, about this group is that 18 of them had no pain. Further, there was a sudden attack of pain in only 14 cases. Eight became unconscious or moribund at the onset of the attack. Seventeen had high blood pressure. Five were women. These facts will bear repeating in percentages. Seventy-five per cent of the cases had a previous history of serious heart disease; 27 per cent had had angina; 37.5 per cent had had attacks without pain; in only 28 per cent was the onset sudden; 35 per cent had high blood pressure; 10.4 per cent were women.

Of the total of 90 autopsy cases of coronary disease 36 were diagnosed as degenerative myocarditis. These patients all had dyspnœa and gradually increasing failure, and died of cardiac insufficiency without pain. Eight of them, however, had a recent coronary thrombosis.

Twenty-eight of the 90 had angina and 15 of these had coronary thrombosis, either before or after the angina. The average length of life of those cases of angina in whom an accurate history could be obtained was approximately forty months. The average length of life of those cases without pain, whose chief symptom was dyspnœa on exertion, and who afterwards gradually developed cardiac insufficiency, was approximately twenty-eight months. These facts tend to prove that angina is an earlier and less serious symptom of coronary sclerosis than is dyspnœa on exertion. Apparently it takes more damage to produce dyspnœa than to cause pain. Twenty-one of these patients developed Cheyne-Stokes respirations. The average length of life after this symptom developed was 15.3 days. The longest period one patient lived after Cheyne-Stokes respirations developed was 105 days.

Twelve of the patients developed attacks of paroxysmal dyspnœa when at rest in bed at night. The average duration of life after this developed was 71 weeks.

Acute pulmonary œdema developed in 11 cases, and was a terminal phenomenon in 9. One patient lived for one month and another lived for sixteen months.

Turning to irregularities of rhythm, 21 developed auricular fibrillation, 1 auricular flutter, and 4 paroxysmal ventricular tachycardia.

The incidence of hypertension is interesting. A higher percentage of the uncomplicated coronary sclerosis group (degenerative myocarditis) had hypertension than had the cases of cardiac infarction or coronary occlusion. Approximately 80 per cent of the cases of degenerative myocarditis had hypertension, while only 35 per cent of the cases of recent infarction had hypertension. Part of this difference can be explained by the fact that coronary occlusion lowers the blood pressure, and many of this group had previously had high blood pressure. This same relationship holds in cases seen in the office. Of 64 cases of coronary thrombosis seen during or after an attack, only 8 had high blood pressure. Of 56 patients with angina, 17 had high blood pressure, and of 69 with chronic degenerative myocarditis, 32 had high blood pressure.

In these 90 post-mortem cases of coronary disease, the predominant symptom during life in 44 was dyspnœa, either paroxysmal at rest or on exertion. Pain was a predominant symptom in 29 cases, due to either angina pectoris or coronary occlusion. In three, the predominant symptom was unconsciousness. The remaining 8 patients were admitted for a non-cardiac complaint, such as hemiplegia, cellulitis of the leg or face, pneumonia, and in these cardiac symptoms were either very mild or absent. We must conclude, therefore, that dyspnœa is the most important symptom of coronary sclerosis, and remember that paroxysmal dyspnœa at night, with orthopnœa, is more than twice as serious as dyspnœa on exertion. These patients exhibit four varieties of paroxysmal dyspnœa, usually with orthopnœa; namely, attacks of deep breathing, lasting a few minutes or longer, coming on usually at night, when the patient has to sit up for varying lengths of

time; attacks of asthma, in which the patient hears a whistling noise when breathing, chiefly on expiration; attacks of acute œdema of the lungs, in which the patient hears a clicking or rattling-noise breathing; and Cheyne-Stokes breathing. These are named in the order of their severity. When patients commence to get any variety of dyspnœa, either on exertion or any of the paroxysmal varieties, we diagnose coronary sclerosis after excluding other causes of myocardial weakness. When signs of œdema or passive congestion occur we recognize that, for the time at least, all cardiac reserve is lost. The diminution of the exercise tolerance gives us a very good indication of the rate at which the disease is advancing. It must not be concluded, however, that the average length of life in this group of cases after shortness of breath on exertion commences is only twenty-eight months. This was the average length of life of a group of these cases that was certainly more serious than the average.

The symptom which impresses patients most, however, is pain in the chest. While the pain of angina might be less serious than dyspnœa, certainly all will admit that the pain of coronary thrombosis is more important, in all respects, than dyspnœa. The analysis of chest pain is one of the frequent and interesting and difficult problems that confront physicians. Omitting the uncommon causes of pain in the chest, there are three common ones—coronary thrombosis, angina pectoris, and pains, due to root involvement from spondylitis. Of some 217 patients who have come to the office during approximately the last year for chest pain, 86 have had spondylitis, 56 have had angina and 64 have had coronary thrombosis. In the remaining 11 no definite cause for the pain could be found. One or two of them might have been cardiac, but most of them were of the nature of spondylitic pains, while no definite evidence of spondylitis could be demonstrated.

Perhaps here one should define angina. Lewis and Parkinson use the term angina to include both what we call angina pectoris and coronary thrombosis, naming the former the angina of effort and the latter the angina of occlusion. The term is, however, here, and in most places in Canada and the United States, restricted to effort pain, and is used to denote a symptom consisting of distress anywhere in the body from the third cervical to the eighth dorsal segmental areas, produced by myocardial ischæmia, which in 95 per cent of cases or more is due to coronary disease. The few remaining cases are due to such causes as aortic insufficiency, myxœdema, pernicious anæmia, etc., factors which interfere with a good blood supply to the heart muscle, with or without increasing its work.

Most people have the idea that angina is a severe and sudden pain. Both these descriptions are more or less untrue. The pain has no one special characteristic. It may be a slight discomfort, a fullness, a pressure, a constriction, a burning, a dull ache, or a severe pain. It is a continuous wave of pain without rapid vibrations. It develops gradually, reaches the crisis, and gradually dies away. It is never a shoot or a stab and does not throb. It is most frequently located in the middle line. It may radiate to one arm or both arms, to the shoulders, to the back or to the neck or occasionally to the face. Its radiation to the left arm or both arms has no serious significance; that is, a pain which radiates to the arms is no more serious than one that does not. Radiation to the arm is important in differential diagnosis, in that it pretty well excludes disease below the diaphragm. Further, radiation to the arm does not, as is commonly thought, prove that a chest pain is of cardiac origin. It lasts for a few minutes—five to ten on an average. Rarely some persons have pain for one or even two hours. These probably have their pains prolonged by nervousness and apprehension, just as an angina lasts as long as the exertion continues, and then dies down in five or ten minutes with rest. The attacks are nearly always induced by effort or excitement, come more easily soon after a meal, or the first thing in the morning, or in cold or windy weather. There usually is no dyspnœa with the attacks. After severe attacks the patients perspire, are weak, and often extremely fatigued. One of the most common accompanying symptoms is eructation of gas, which is no doubt a vagal reflex. The sense of impending death is related to the severity of the pain, plus the apprehensiveness of the patient, and is of on diagnostic value, as it is more frequent in hysterical attacks. It is naturally much more common in coronary thrombosis than in the angina of effort. Cutaneous or subcutaneous hyperæsthesia often accompanies or follows the

pain, as it occasionally does any pain, even a headache. It has no diagnostic or prognostic value, for it is just as often present with unimportant non-cardiac pain. Hyperæsthesia is more likely related to hypersensitiveness in the patient.

The ease with which the pain is induced is much more important than its character. As the underlying disease advances, the distress which at first probably requires hurrying up a hill to induce it, begins to come more frequently and with slighter exertion. Finally, it may come with slight excitement, or after a meal, or when stepping out into the cold or wind, or in bed, from possibly a dream, or from no discernible cause whatever. When the so-called angina decubitus occurs, cardiac infarction should be suspected. The important diagnostic point is that the distress is a response to effort or excitement, and comes during the exertion and not some time after it. A patient might deceive one by stating that walking brings on the discomfort when the distress actually occurs some hours after walking, possibly in bed that night. Anginas are occasionally overlooked when the distress is in an uncommon area, such as the forearms, wrists or epigastrium. Another fairly common source of error occurs when a patient states that he gets epigastric discomfort after meals or substernal discomfort after meals, when really the pain is produced by walking after a meal.

The pain which is most commonly mistaken for angina is that due to root involvement from spondylitis. This pain is usually unilateral, almost never in the midline, and varies in three respects, being sometimes sharp, sometimes dull, or of some other character, such as a burning, or an ache or a tired feeling. It varies in duration, lasting sometimes a second or so or a few minutes or hours, days, or even weeks continuously. It also varies in situation from time to time, occurring in three or four or more places in the chest. These variations in character, duration and situation all occur in the same patient. On the other hand, in the same patient angina is in the same situation, and has the same character and duration, except for slight variations due to differences in the degree of exercise. Spondylitic pains are frequently worse in bed, are often related to position in bed, and are induced by some special movement, rather than by exertion, such as walking.

The diagnosis of angina is made by inquiry alone, and therefore, in these cases, inquiry is more important than physical examination, x-ray or electrocardiagraphic investigation. One first asks concerning the exact situation of the pain, including the radiation, noting whether or not it goes below the cardiac area for pain. Then one asks whether or not it is always in the same place, or if it shifts. If it occurs in two or more places, the pains are probably not cardiac. Then, does pain occur in any other part of the body? Many patients have pains nearly all over their body and worry only about the one in the left chest. In a patient with many pains, be sure that one special one does not occur constantly from exertion, because spondylitis and angina are occasionally associated. Five per cent of anginas have spondylitic pains.

The next question one asks is how long does each pain last continuously at one time? If it be a shoot of pain lasting only a second or so, or a few seconds, it is too short to be angina; if it lasts for hours or days, it is too long. If it lasts for hours or days, and the total duration is short, such as a week or two, it may be due to coronary occlusion. If, however, the total duration be months or years, then it has continued too long and occurred too frequently to be due to coronary occlusion. Unlike angina, these arthritic pains, when they last for years, are frequently absent for weeks or months at a time, and are therefore periodic.

Then one asks concerning the factors which influence the pain. Is it worse in bed or when up? Arthritic pains often are worse in bed, and are relieved by exercise. Is the pain related to position in bed or does rolling over in bed bring it on or relieve it? Does bending, reaching or any special movement affect it? These points, if present, are in favour of an arthritic origin. If walking brings on the pain, inquire whether walking does so regularly or occasionally. A spondylitic pain does occasionally come when walking, although it is rather remarkable how rarely it does. If the patient says walking brings on the pain, ask whether the pain comes during walking or afterwards. Anginal pains come during and spondylitic pains afterwards, when tired.

On examination, in 20 or 25 per cent of cases nothing can be found wrong with the heart in angina pectoris. Anything abnormal, such as

enlargement, dilatation of the aorta, hypertension, arterial disease, aortic valve disease, irregularities of rhythm or electrocardiogram, merely confirm but are not necessary to establish the diagnosis.

In the great majority of cases, the diagnosis of angina pectoris is easy. It is difficult only when patients give you contradictory answers. The diagnosis of coronary thrombosis, in 66 per cent of cases, is also relatively easy, but more difficult than angina. In the remaining 33 per cent, the diagnosis of coronary occlusion is extremely difficult, and in some, impossible. This has been very well shown by the information elicited in the investigation of the previously mentioned autopsy cases. Speaking generally, the distress of coronary thrombosis is more severe, more widespread, and more persistent than angina. The most important character from a diagnostic viewpoint is the duration of the pain. It may last any length of time from a few minutes up to a few days. The severe pains are not relieved by nitroglycerin; some of the milder ones, however, are. In this paper, no attempt is made to distinguish between cardiac infarction and coronary occlusion, except to mention that our autopsy analysis showed that patients with cardiac infarction from coronary narrowing, without actual thrombosis, were more likely to be free of attacks of pain or dyspnœa.

Graded according to severity, there are four types of cases of coronary occlusion. The most severe group is made up of those dramatic cases where the sufferers drop dead, or collapse, gasp for breath, vomit, and die in a few minutes or a few hours, with terrible agony or very severe dyspnœa. This group represents only a small fraction of all cases.

The second group is made up of those cases of average severity that are commonly diagnosed. They have severe, persistent pain in the chest for a few hours or a few days, of gradual or sudden onset, with or without vomiting, shock, pallor or cyanosis, sweating, and more or less of cardiac signs, such as rapid, thready pulse, dyspnœa, œdema, a new rhythm, fall in blood pressure, pericardial friction, and with an early leukocytosis, and a fever delayed, usually until after thirty-six hours. Such cases can be diagnosed with ease and certainty. This group is many times more numerous than the first. The mortality of this group is approximately 35 to 40 per cent.

There is a still larger group of mild cases, frequently undiagnosed, because they have atypical, slight or mild pain, or no pain at all. In this group, the pains may be short, may come sometimes on effort and sometimes not, and when mild may be relieved by nitroglycerin or alcohol or heat. Some have only an unaccountable attack of weakness or dizziness or dyspnœa, or unconsciousness for a moment or two, and afterwards feel quite well. There is an almost infinite possibility of variation in the mode of onset of this group. One of us (J.A.O.) almost missed two cases with attacks of dizziness and weakness, because previously the patients had had Menière's syndrome, and their coronary attacks gave them almost identical symptoms. This group of mild cases carries a mortality of about 10 per cent. Whenever any sudden change occurs in the condition or function of the heart, coronary occlusion should be suspected. The following are some of the changes that may occur—a sudden lessening of the exercise tolerance; the sudden appearance of circulatory failure; an unaccountable increase in the degree of circulatory failure; the initial attack of a new rhythm, such as auricular fibrillation or flutter, or paroxysmal tachycardia, in a person of sclerotic age; or the appearance of any form of block, or pulsus alternans; the initial attack of cardiac asthma or acute œdema of the lungs, or angina; or a marked increase in the frequency of attacks of angina, or the ease with which they are induced, or when they commence to come at rest in bed. In this third mild group, fever and leukocytosis may be absent, and there will likely be no change in the heart or circulation on physical examination. In these cases, the diagnosis can only be proved by finding the characteristic changes in the shape and direction of the T waves in a series of electrocardiograms over a period of a week or two.

The fourth group is made up of cases without symptoms. That such a group exists, we know from autopsy findings. Some of this group have a supervening coronary thrombosis on the top of serious myocardial failure. Others have an attack and feel well and work through it, and do not know that anything has happened.

To sum up, the systematic diagnosis of coronary thrombosis is made on some of the follow-

ing points. Seventy per cent have a previous history of angina or dyspnœa on exertion. The nature of the attack of persistent pain is frequently alone sufficient to make the diagnosis. What other disease can produce such severe distress all over the chest and possibly down both arms? The nearest approach to it would be a dissecting aneurysm of the aorta. A spontaneous pneumothorax might simulate the symptoms of coronary thrombosis rather closely.

A slight to moderate leukocytosis occurs almost as soon as the pain.

A slight to moderate degree of fever comes usually on the second or third day.

Serious cases show some change in the heart or circulation, such as weak, rapid pulse, pallor, sweating, shock, collapse, cyanosis, dyspnœa, weakness, faintness, unconsciousness, œdema of the lungs or legs, enlargement of the liver, gallop rhythm, a new rhythm, pulsus alternans, fall in blood pressure, or a friction rub.

Embolism occurs in 15 per cent of cases, from thrombosis within the ventricle at the infarcted area.

The most constant confirmatory evidence is the electrocardiographic change, which occurs in 97 to 98 per cent of cases. This may precede the pain, but is usually delayed, especially in mild cases, for a few days, or even a few weeks. The so-called coronary T waves are not diagnostic, because they occur occasionally in other forms of heart disease, and they are by no means always present in coronary thrombosis. The diagnostic feature is the series of rather rapid changes in the shape and direction of the T's. These changes occur from hour to hour in severe cases, and more slowly in mild cases. To establish a diagnosis, therefore, in uncertain cases, it is necessary to take a series of electrocardiograms over a period of a week or two or even longer. A mild case of coronary thrombosis might have a perfectly normal electrocardiogram one day and another normal one day later, but the T waves be sufficiently different in shape to establish the diagnosis.

In the previously mentioned 48 cases of recent infarction found at autopsy, electrocardiograms were not taken in 11. Of the remaining 37, 6 showed typical electrocardiograms of coronary thrombosis of the T1 type; 6 showed typical changes of the T3 type; the remaining 25 showed atypical electrocardiograms that did not fit either the T1 or T3 types. In all the 37 cases, however, definite electrocardiographic abnormalities were present, and in all cases where serial records were taken, excepting one where auricular fibrillation and digitalis effects masked the changes, the electrocardiographic abnormalities changed rapidly throughout the series. That is, 36 out of 37 cases showed changes in the T waves, either in the level of the take-off or in the shape and direction of the T, which we regard as diagnostic of cardiac infarction. Intraventricular block, including branch bundle block, was present in 8 cases. Auricular fibrillation was present in 7 cases. It was transient in 4 of the 7. Auriculoventricular conduction defects were present in 6 cases. A prolonged PR interval was seen in 5 cases, and incomplete block in one.

We are therefore convinced that rapid changes in the RT segment and in the direction and shape of the T waves of the electrocardiogram are the single most constant diagnostic factor of coronary occlusion and cardiac infarction.

OXYGEN IN THE TREATMENT OF ACUTE CORONARY OCCLUSION.—Barach and Levy state that anoxæmia of the heart muscle occurs after sudden occlusion of a sizable coronary branch. The inhalation of oxygen in high concentration increases the oxygen content of the arterial blood and results in improvement in the functional capacity of the heart. The beneficial effects of oxygen treatment in cases of coronary thrombosis have been confirmed in clinical reports by Ulrich, Kilgore and Bickel. A group of 16 new cases that the authors have studied have confirmed their earlier impressions and, in the cases which have responded favourably, may be summarized as follows. (1) Subjective improvement occurred in from one to three hours after the administration of oxygen was begun. The relief of pain was striking. Respiration became less laboured and slower. The patient was no longer restless. It was therefore possible to curtail materially or even stop entirely the use of morphine and other sedatives. (2) Cyanosis was diminished or abolished. (3) Cheyne-Stokes breathing, if present, gradually disappeared. (4) The temperature, in cases in which it was elevated, tended to fall. (5) The heart rate became slower. The heart sounds grew stronger and the volume of the pulse improved. The signs of congestion in the lungs became less marked. As the state of the circulation improved, the arterial blood pressure rose and the venous pressure fell. (6) Interruption of oxygen therapy before adequate readjustment of circulatory conditions had taken place resulted in recurrence of the foregoing symptoms and signs. The oxygen given has been usually in a concentration of 50 per cent.—*J. Am. M. Ass.*, 1934, **103:** 1690.

THE TREATMENT OF CORONARY DISEASE*

BY JOHN HEPBURN,

Toronto

THE treatment of those suffering from the clinical manifestations of coronary disease is obviously too wide a subject to be treated in detail in a paper such as this. I have, therefore, attempted merely to outline the general scheme of handling such cases, and I have dealt with some of the newer and more important modes of treatment somewhat more fully. Dr. Oille has pointed out that coronary disease appears clinically as degenerative heart disease, angina pectoris, and cardiac infarction, the first being much the commonest. Obviously, these three forms may occur separately or may coexist, and I am dealing with them separately only for the sake of clarity.

DEGENERATIVE HEART DISEASE WITHOUT CARDIAC INSUFFICIENCY

Here the main complaint is shortness of breath on exertion, and our treatment is directed along very general lines. The patient should be advised to keep his physical activities within the limits of distress, to take additional rest daily, to cut down his social, lodge and other such activities, and we should advise him along common sense lines to be abstemious about eating, drinking, etc., and also we should attempt to improve his general health by clearing up focal infection, especially in the mouth, and by treating anæmia, diabetes, etc., if present. One should also be on the lookout for hyperthyroidism due to toxic adenomata, the removal of which may improve the condition. Drugs have little part in the treatment of such cases unless auricular fibrillation is present, when the heart rate may need to be reduced to 70 - 80 by the use of digitalis, gr. ii of the powdered leaf daily being generally adequate. Some patients may not be getting sufficient sleep and drugs of the barbiturate group are then useful.

DEGENERATIVE HEART DISEASE WITH CARDIAC INSUFFICIENCY

When the signs of passive congestion, such as, œdema of the legs, enlarged liver, ascites, râles at the lung bases, and pleural effusion, are present the patient ought to be kept strictly in bed for a month after the signs of failure have cleared up. Elevation of his head and shoulders is usually necessary to lessen dyspnœa, and a hospital bed makes him more comfortable and renders nursing very much easier.

Diet.—Unless the case is very severe, ordinary hospital diet in reduced amounts is adequate, but the total fluid intake should be curtailed to 20 to 25 ounces daily, and the œdema will clear up more quickly if salt is withheld from the patient's tray.

Drugs.—Most cases do better when first coming under treatment if given a routine mild sedative, such as codeia, gr. ½, and bromide, gr. vii, three times a day, and, for sleep, a double dose of the same prescription. If sleep is even then inadequate, one should not hesitate to give stronger sedatives.

Saline purgatives.—When necessary a daily saline, to assure one or two fairly loose movements, is often efficacious in clearing up œdema.

Diuretics.—The reduction of salt and the use of digitalis suffices in many cases to promote diuresis, but at times other aids are necessary. The purin body group, such as theocine, theobromine, etc., are often effective, but they have a marked tendency to cause nausea and vomiting. Theocine, in doses of gr. v-viii every four hours, may be tried for two days at a time, but should be discontinued immediately if diminution of urine occurs. Salyrgan, 0.5-1 c.c., intravenously, is at present the best diuretic, but should not be given oftener than twice a week. It works more slowly, but almost as well, when given deeply, intramuscularly. Salyrgan should not be used in the presence of acute nephritis.

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Apart from its effect in cases of fibrillation, digitalis is a good diuretic and has been shown to improve the output of the heart in cases of dilatation of the heart. Doses of two to three grains daily are usually adequate. Massive doses of digitalis should be reserved for emergencies or urgent cases.

The removal of fluid from pleural and peritoneal cavities is often necessary to relieve dyspnœa, and, at times, seems to turn the scale in the patient's favour. Mild grades of hyperthyroidism are readily overlooked in cases of heart failure, and partial thyroidectomy may lessen the work of the heart sufficiently to enable the patient to carry on without failure.

ANGINA PECTORIS

Dr. Oille has pointed out that 95 per cent of the cases of angina pectoris are due to coronary disease, and one ought to come to the conclusion that a patient has or has not angina pectoris. Sub-groups and qualifications, except mild or severe, according to the ease with which the attack is precipitated, should be discarded. Multiplicity of terms leads to looseness of diagnosis and the labelling of the præcordial pain of dorsal spondylitis, for example, as angina pectoris of some kind frightens the patient unnecessarily. In the light of our present knowledge it seems certain that angina pectoris is always due to the heart muscle working in the presence of inadequate blood supply. The treatment of the anginal case falls under two headings.—

1. *The immediate treatment of the attack.*—The most important part of this treatment is soon discovered by the patient, namely, ceasing the effort which precipitates the attack. The inhalation of amyl nitrite or the oral administration of nitroglycerin, gr. 1/100, quickly alleviates the distress. At this point, it is interesting to note that very recently an explanation for the old empirical instruction, that nitroglycerin should be sucked and not swallowed whole, has been given. For it is now known that nitroglycerin is absorbed much more promptly from the mouth than from the stomach.

2. *Remote treatment.*—The soundest advice that can be given to an anginal patient is to regulate his activities so that attacks are avoided. In addition, the same advice as is given to the ordinary patient with degenerative heart disease is applicable in its entirety. A few cases of fairly severe angina pectoris will be entirely relieved of attacks and regain some of their lost exercise tolerance on clearing up mouth infections. We occasionally see cases which have been diagnosed as angina pectoris admitted to hospital and discovered to be examples of pernicious anæmia, the angina disappearing when adequate amounts of liver are administered. Diabetes should be treated.

Various surgical procedures have recently had a vogue in the treatment of angina pectoris. All the available experimental evidence indicates that, while the sympathetic nerves constrict arteries in general, they dilate the coronary arteries, which are constricted by the vagi. Section of the sympathetic nerves, therefore, results in an unopposed vagal action which would constrict the coronary arteries and, thereby, decrease the blood supply to the heart. Many forms of resection of the cervical sympathetic nerve have been done with results varying from complete to no relief of the anginal attacks. These operations carry a fairly high operative risk, and when pain is relieved it is because the pathways carrying the impulses which are interpreted as pain are severed. So, such a procedure may relieve pain —a useful danger signal—but we believe it decreases the coronary blood supply and is, therefore, to be condemned.

Sympathetic impulses from the heart to the central nervous system enter the spinal cord through the upper six posterior roots in the dorsal region, mainly on the left side. This knowledge has been used to devise a method for the relief of anginal pain without any operative risk, namely, the destruction of this afferent pathway—the white rami communicantes—by alcohol injection. This treatment has a high percentage of effective relief of pain without any mortality, but, again, it destroys efferent sympathetic paths and results in a smaller coronary blood supply. A more recent but more drastic form of treatment is now being tried out, namely, total thyroidectomy. Blumgart, Levine and Berlin,[1] of Boston, during 1933, had about 100 cases of serious heart disease, including angina pectoris, subjected to total thyroidectomy with amazingly good results. This form of treatment is based on the following physiological principle. The demands on the heart vary directly with the basal metabolic rate, and you are all familiar

with the striking improvement in cases of hyperthyroidism with heart failure after a partial thyroidectomy has been done. This improvement is due to lessening the work of the heart by returning the raised metabolic rate to or about the normal level. Blumgart and his collaborators reasoned that, as angina pectoris was an expression of cardiac overwork, the distress might be relieved in cases with normally functioning thyroid glands by materially reducing the basal metabolic rate by total thyroidectomy. (In hypothyroidism the metabolism of the heart itself is reduced, thereby also reducing the work of the heart). I saw many of their patients at the end of last year, and was so impressed by their results in cases of angina pectoris that we have had a small series done at the Toronto General Hospital with very gratifying results.

CASE 1

Mr. L., 44 years of age, had coronary thrombosis in 1930. He made a good recovery till early in 1933, when he began having attacks of angina pectoris, culminating in another coronary thrombosis in March, 1933. Following this, his exercise tolerance lessened markedly. He was confined strictly to bed after July 1st because of anginal attacks brought on by such slight effort as trying to turn over or sit up in bed, speaking for a few moments, or the slightest emotional strain. These attacks occurred daily for nine months, and for most of that time he was receiving morphine in doses up to gr. 1½ daily. When seen in April, 1934, he was advised to try total thyroidectomy as the only possible hope of relief. This operation was done by Dr. W. E. Gallie on April 6, 1934. Morphia was discontinued on the fourth day after operation, and he was given luminal by day and paraldehyde at night because he was fidgety and sleepless.

He has had no præcordial pain since the operation and was out of bed in two weeks and walking about his room at the time of his discharge a week later. Within a week of returning home he had discharged the nurse who had been with him since July, 1933, and the latest report, on June 16, is that he has gained three pounds since the operation. He does not perspire on the hottest day, has a soft, silky skin, is out of bed nine hours a day, takes several short walks daily, has had no præcordial pain, and is taking no sedatives.

CASE 2

Mr. C., aged 52, had angina pectoris since 1930, becoming progressively worse; attacks of coronary thrombosis in March and August, 1933. In April, 1934, on repeated tests, pain appeared consistently after walking 80 to 100 yards. Total thyroidectomy was performed on April 24, 1934, by Dr. Gallie. Three weeks after operation his exercise tolerance was again tested and he walked 600 yards at the test rate without the appearance of pain. He is not at work, but is walking around daily and has had no angina since the operation.

CASE 3

Mr. J., aged 61, a case of angina, was operated on in April, 1934. When seen on June 13, he stated that he had only had pain on three occasions when walking immediately after a meal. Apart from this pain after meals, his exercise tolerance has increased greatly.*

The velocity of blood flow varies directly with the basal metabolic rate in people with healthy hearts, *e.g.*, in hyperthyroidism, the velocity of the blood is increased; it is decreased in hypothyroidism. In heart failure the velocity of the blood flow is reduced so that the blood supply to the tissues is inadequate for the metabolic requirements. Blumgart and Levine reasoned that by making heart failure cases hypothyroid the reduced blood flow might become adequate for the patients if their basal metabolism rate were lowered by total thyroidectomy. Their series of heart failure cases so treated has shown satisfactory results.

When one considers that the patients subjected to this form of therapy are totally incapacitated, the 10 per cent mortality is more than offset by the improvement of the majority of the survivors. This improvement is less spectacular than in the anginal cases, but at times is amazingly good.

Total thyroidectomy has been done on 5 of our patients. One died forty-eight hours later of acute œdema of the lungs; 1 was not benefited and died three months later; 2 are greatly improved; and the fifth, a man in the forties who had gross failure for weeks before the operation, is now entirely free from failure, can walk for miles, and has climbed four long flights of stairs without any distress, and has returned to work. All the patients stood operation very well, except the woman who died of acute pulmonary œdema. Her pulse increased greatly during the operation which was discontinued on that account. None of the patients had any degree of post-operative thyroid storm.†

The treatment of angina pectoris due to syphilitic aortitis does not fall within the scope of this paper, but it may not be amiss to mention that our results show that such patients stand antiluetic treatment well and that those who receive most treatment live longest.

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* The improvement in Mr. L and Mr. C. has been maintained (October, 1934). Mr. J.'s anginal attacks come on after as little exertion as before operation.

Two female patients have been operated on. One has been entirely relieved; and, in the other case, angina decubitus has cleared up and the angina of effort is greatly improved.

† In October, 1934, of the three surviving patients, one of those reported as greatly improved is in hospital with failure, and the fifth has been in hospital with failure.

CARDIAC INFARCTION

This condition, as has been pointed out, is usually due to coronary thrombosis, but occasionally results from coronary embolism and from coronary stenosis without thrombosis or embolism. Post-mortem findings indicate that extensive infarction of the heart can occur without any symptoms. It is difficult to understand this in view of the excruciating pain and collapse so often seen in cases which at post-mortem may show only a small area of infarction. Perhaps the rapidity of the arterial occlusion is the determining factor. The most important point in the handling of cases of cardiac infarction is their recognition, so that absolute rest can be enforced at once. Too many such patients are still given alkaline mixtures for dyspepsia, or patted on the back, and advised to take vigorous exercise for their so-called neuritis, or, less often, subjected to a laparotomy as cases of ruptured peptic ulcer.

Pain.—In the treatment of the average case, the first consideration is relief of pain. When the pain is severe, doses of morphine, ¼ gr., should be repeated every fifteen minutes until the pain is bearable. Doses of ½ gr. are frequently given, but such an initial dose is dangerous in patients whose tolerance to morphine is unknown.

Shock.—Shock is often present and may be the most marked feature of the case. The treatment of shock is a most trying problem, as a moderate fall of blood pressure is advantageous to the patient for thereby the work of the heart is materially reduced. Cardiac or cardiovascular stimulants should be avoided unless it appears that the shock is increasing and endangering the patient's life. Further, much of the shock is due to pain and relief of the pain mitigates the shock. Digitalis, caffeine, etc., should not be used unless some complication arises. If the heart rate is very rapid and the blood pressure is falling, strophanthin, gr. 1/100, or digoxin, 1 mg., should be given intravenously and may be repeated in two hours if necessary. For shock that is severe or increasing, as evidenced by low and falling blood pressure, caffeine sodiobenzoate, gr. 7½ to 15, or coramine, 2 to 3 c.c. intravenously, are the most efficacious remedies and, if necessary, either may be repeated in a few minutes. The intravenous is the only satisfactory route for treating shock, as absorption of drugs given by other routes is questionable and probably poor.

If a severe degree of cardiac failure develops, the failure should be treated as in similar cases not due to infarction of the heart. Ventricular tachycardia occasionally occurs, and is usually recognized electrocardiographically, but may be suspected or diagnosed when, following coronary thrombosis, the rate suddenly increases, the blood pressure falls, and on auscultation a very slight variation in force and rhythm is discovered. This is a very serious complication, especially as the stomach is usually badly upset and the oral administration of quinidine results in vomiting. We have had very good results with the intravenous use of quinidine sulphate in cases of ventricular tachycardia. Fifty grains are dissolved in 500 c.c. of 5 per cent glucose and given slowly intravenously. In all our cases so treated, normal rhythm has been restored by the time the patient has received 15 to 25 grains of quinidine.

Rest.—The patient should be kept strictly at rest, the head of the bed being raised if dyspnœa is present. Heat, in the form of electric pads, etc., should be applied if the patient is cold and clammy. For the first four weeks the patient should lie quietly, being fed, turned over, lifted on the bedpan, etc. At the end of that time, this regime may be relaxed gradually, and the patient permitted to turn over in bed, handle books, and read, and he no longer need be fed. If heart failure has not appeared, the patient should be allowed up at the end of eight weeks and in the course of another couple of weeks should be walking round the house.

Diet.—For the first day or two, especially if shock is present, with its common accompaniment — vomiting, nothing should be given by mouth except sips of water. Then, small meals of easily masticated food, such as, milk puddings, custard, cereals, poached egg, etc., are given and, gradually, increased to an ordinary mixed diet, but reduced in quantity. Should heart failure appear, the fluids and salt in the diet should be restricted.

Sleep.—Sleep should be ensured by the use of mild sedatives when necessary.

Bowels.—For the first few weeks an enema on alternate days is the least disturbing method of caring for the bowels. Later, mild laxatives, such as milk of magnesia, may be substituted for enemas.

FUTURE PHYSICAL ACTIVITIES OF PATIENTS WITH CORONARY THROMBOSIS

Most patients who have survived an attack of coronary thrombosis lead too restricted lives. They should be advised to take exercise in the form of walking, golf, etc., provided that such exercise does not cause undue fatigue or dyspnœa or præcordial distress. Many people who have had infarction of the heart are leading active lives, both physically and mentally.

CARDIOVASCULAR TONICS

Recent experimental work has added greatly to our knowledge of cardiovascular stimulants, and, as in other fields in medicine, has led us to discard several time-honoured drugs. The requirements of a good cardiovascular stimulant are: (1) A tonic effect on the heart muscle, *i.e.*, it should enable the heart to do the same work, with a smaller diastolic volume; (2) dilatation of the coronary arteries, to improve the blood supply to the heart; (3) a tonic effect on the peripheral arterioles, raising the blood pressure; (4) such effects should be lasting, or, if evanescent, the drug should be quickly destroyed, so that it can be repeated frequently without harmful results.

The conclusions of workers in this field are at variance with one another because some were using innervated while others were using denervated hearts. Again when, as so often happens, a drug has a desirable effect on one part of the mechanism and a detrimental effect on another part, the net results may be very variable in a group of patients.

Digitalis and strophanthin have lasting tonic effect on the heart in doses that do not affect the heart rate, but, to offset this, these drugs constrict the coronary arteries. They decrease the cardiac output per minute of normal hearts, but increase the minute output of dilated hearts. *Caffeine* has an evanescent tonic effect on the heart, and, like the other purin bodies, theobromine, etc., it dilates the coronary arteries very effectively.

Camphor dilates the heart, but also dilates the coronary arteries. *Strychnine* has no effect on heart tone or on the coronary arteries. *Pituitrin* dilates the heart and constricts the coronary arteries, both undesirable effects, but it raises blood pressure by its peripheral action.

Amyl nitrite does not alter heart tone; it dilates the coronary arteries, but it lowers the blood pressure by its dilating effect on the peripheral arterioles. So, while it is decidedly not a cardiovascular stimulant, it treats angina very effectively by lessening the work of the heart by lowering the blood pressure, and it improves the blood supply to the heart by dilating the coronary arteries. *Quinidine* dilates the heart, but has no effect on the coronary arteries. *Adrenalin* dilates the coronary arteries, raises the blood pressure, and strengthens the force of contraction of the heart.

I was unable to find any experimental data on the action of *coramine,* but clinical use indicates very clearly that it is a very effective cardiovascular and respiratory stimulant in doses of 2 to 5 c.c., intravenously. Further, it appears to be destroyed rapidly, and can, therefore, be repeated at short intervals.

To sum up our knowledge of cardiovascular stimulants. Strychnine is probably useless. Camphor probably is disadvantageous because of the resulting dilatation of the heart. The blood-pressure-raising effect of pituitrin may more than offset its undesired effects on both the heart and coronary arteries. Digitalis and strophanthin are effective stimulants in spite of their constricting effect on the coronary arteries. Caffeine, adrenalin, and coramine are the best of the group; their action is rapid and they can be repeated at short intervals. In the case of cardiac infarction adrenalin may raise the blood pressure temporarily to a level that is undesirable, and adrenalin intravenously is apt to cause ventricular tachycardia, so that coramine and caffeine are safer.

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"For myself I found that I was fitted for nothing so well as for the study of Truth; . . . . as being gifted by nature with desire to seek, patience to doubt, fondness to meditate, slowness to assert, readiness to reconsider, carefulness to dispose and set in order; and as being a man that neither effects what is new nor admires what is old, and that hates every kind of imposture. So I thought my nature had a kind of familiarity and relationship with Truth".—Bacon (Proem to the *Interpretatio Naturæ*).

THE REMOTE PROGNOSIS IN HEART DISEASE*

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MY excuse for reading a paper on remote prognosis in cardio-vascular disease is not that I can, nor will try, to teach you much on the subject but, rather, that I wish to draw attention to certain principles relating to the remote prognosis in disease generally, which are more important than many of us suppose, and which, with the advent of periodical health examinations, will continually become more important.

Not so many years ago, the remote prognosis — the long range outlook — was not discussed. Patients never consulted their doctors until the carcinoma was well advanced, the diabetes extreme, or the angina pectoris disabling, and Hippocrates had observed, nearly twenty-four hundred years ago, that well-developed chronic diseases had uniformly fatal results. There was no very remote prognosis, except for the good lady who enjoyed her ill health as she enjoyed a chat with her physician, and for the sufferers from the acute infections and functional disturbances. But latterly there has been a change for the better, in that patients consult their physicians while still in apparent health, for critical opinions and sound advice as to the best means of postponing the passage of the Styx. Valuable employees are referred for opinions as to whether sound minds are still housed in sound bodies; and, very properly they may be, if the referees have a proper philosophical outlook on prognosis and the responsibilities borne by the patient. Any one of us can recall a dozen family fortunes squandered because of the defective judgment of the head of the family suffering from cerebral arteriosclerosis. And all too frequently the ruin extends beyond the family, if the arteriosclerotic victim controls large interests. For example, there is very good reason for believing that Germany failed to get a quick military decision in 1914 because of a commander-in-chief suffering from leukæmia. Apropos of army commanders and ill health, a Swiss general, in civil life a physician, spent the four years of the Great War with his colours and, with the combined insight of the soldier and the practitioner of medicine, wrote a rather remarkable book on the Great War and on the far-reaching effects of ill health and senility in the higher commands upon the destinies of the nations. His conclusion was that the Great War was lost several times by both sides for these very reasons.

The attitude of people to this matter of health is at times astonishing. The public seems to believe every man mentally and physically fit who can walk on level ground without assistance, and who has some memory and no active hallucinations. Here it may not be malapropos to cite a recent ridiculous enactment of the Parliament of Canada, which sets the age-limit for the Governor and Directors of the new Central Bank at seventy-five. Anything more asinine than leaving the control of the nation's money, and, therefore, the control of commodity prices, including the prices for all the wheat soon to be harvested upon the acres we see about us on all sides here in western Canada, to a batch of dithering dotards, could scarcely be imagined. For such posts the limit should be sixty-five, and not a day more! There may be exceptions to this rule, but who is capable of correctly making them?

As a profession we have not yet seriously tackled the problem of incipient disease. Not so many years ago an unbiased, but superficial, observer, would have said that we were not interested. Actually, the reason for our apparent lack of interest was our inability to make diagnoses while disease was in its incipient stages, and, the acute infections and a few other diseases excluded, it is only in the incipient stages of disease that there is any fairly remote prognosis. Fortunately, a clearer

* A contribution to a symposium on cardio-vascular disease at the Annual Meeting, Calgary, June 22, 1934.

understanding of the life histories of diseases, and the wonderful achievements of the laboratory workers have greatly increased our ability to detect disease processes early, when therapy, laggard that it is, may accomplish something of value. In other words, as a profession, we are only now, at this late date, beginning to be able to do for our patients that which they have hitherto prematurely credited us with being able to do.

With respect to remote prognosis in disease of any sort, cardio-vascular disease included, the text-books content themselves with vague statements that it is "good", "fair", or "bad". What those terms may mean is not very clear to the reader, and certainly very little clearer to the authors of the text-books. In other words, authors and practitioners have been innocent of any knowledge on the subject of prognosis which might be dignified by the adjective "scientific". And someone has aptly said that we have no scientific knowledge of anything until we are capable of measuring it. How may one measure prognosis?—in other words, prospects for long life? A yard-stick of some sort is as important as for the land surveyor. There is only one accurate way, which is, by comparing the prognosis or prospects of the patient with those of an average healthy person of the same age and sex. While there are several ways of evaluating life prospects, the simplest index and the easiest to comprehend is Life Expectancy. Do not be alarmed at the term, and do not be too sure that you know what Life Expectancy is.

Life expectancy, or expectation of life, may be defined in different ways. For instance: (a) The number of years which persons of any given age will live, on an average, beyond that age. (b) The number of years which a person of any given age has a chance of living. There is a slight inaccuracy in this statement which we will ignore.

In theory, an extremely long-lived person could establish the life expectancy at any given age, say 40, by selecting a large number of persons all of that age, watching them carefully until all were dead, adding up the total number of years that each and every one had lived, and dividing by the number of persons in the group at the beginning of the experiment—obviously not a practical method for a variety of reasons, but it will serve for purposes of illustration. Actually, various methods of analysis are applied to census figures and the like, a table of mortality results, and from that, tables of life expectancy and other tables are calculated. But you, as practitioners, require a simple formula by which to determine the normal life expectancy; here it is:

TABLE I

If under 65 years of age: 80 minus the age and multiply by 0.8.

Thus, at age 40 .... $(80-40)\frac{8}{10}$ .... 32 years.

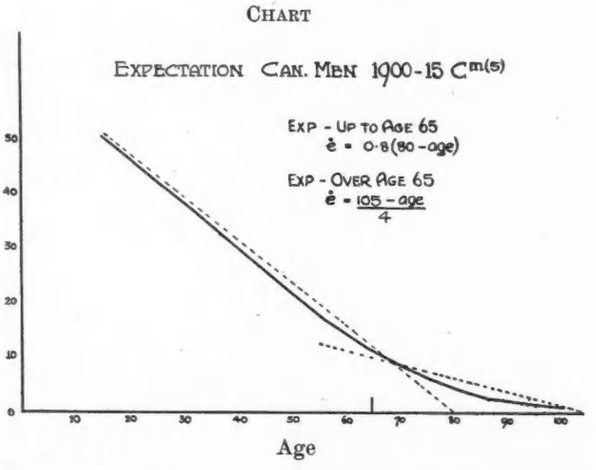
at age 60 .... $(80-60)\frac{8}{10}$ .... 16 years.

At ages 65 and over: 105 minus the age, and divide by 4.

Thus, at age 75 .... $\frac{(105-75)}{4}$ .... 7½ years.

at age 85 .... $\frac{(105-85)}{4}$ .... 5 years.

CHART



The chart illustrates the closeness with which the rough and ready formulæ given above approximate the true expectation of life for Canadian men as given in the Table of Mortality prepared by the Dominion Bureau of Statistics. The solid line represents the true expectation, the dotted line, the results of the use of our simple formulæ. You will notice that the expectation is given very accurately, being only a trifling amount away from the truth at any age. It is worth while memorizing the formulæ, if for no other purpose than to mystify one's patients! If you can tell the average man his expectation of life without reference to a book, he is apt to conclude that you are clever.

The formulæ just given are for average healthy persons, and while the Table was deduced from the observation of males it is reasonably applicable to females. But many of your patients are not average healthy persons. For such there is one step which pre-

cedes the rough calculation of expectation of life for any given patient. This consists of arriving at a sound opinion as to the percentage the patient's mortality rate will be increased by his particular disease or disorder. Suppose that the patient has a particular disease, and from your reading you know that the number of deaths per thousand for the remainder of the lives of a group of such persons will be 60 per cent in excess of normal. Each 10 per cent of extra mortality (beyond the normal) is roughly equivalent to adding one year to the age, a bit more than a year at the younger ages. That patient is for all practical purposes six years older than his birth certificate shows. If the mortality rate expected is 100 per cent in excess of normal (*i.e.*, double the normal), he is ten years older than he imagines, so far as his longevity prospects are concerned. If the man is aged 50, for practical purposes he is aged 60. At age 50, his expectation of life is $0.8(80-50)=24$ years; at age 60, $0.8(80-60)=16$ years. Each 10 per cent of extra mortality has the same effect as becoming a year older and reduces his expectation 8/10th of a year. For example, an excess mortality rate of 150 per cent (*i.e.*, a mortality rate of 250 per cent of normal) reduces the expectation of life $\frac{8}{10}\times\frac{150}{10}=12$ years. The rule, then is: for each 10 per cent extra mortality add one year to the age to get his virtual age, and to get his expectation of life deduct 8/10th of a year from the normal expectation for each 10 per cent extra mortality.

Now we are in a position to investigate the remote prognosis in a number of diseased states.

Let us begin with that ubiquitous subject of systolic blood pressure — the afternoon tea topic of the dowagers — What is normal systolic blood pressure, the patient being in every other way a normal subject? The old rule as to systolic pressure was "one hundred plus the age", expressed as millimetres of mercury. While none of you teaches it to his patients, one hears it quoted continually by the laity. A later and better rule was: "For every two years beyond age 20, add one millimetre to 120". Such rules were arrived at by taking the systolic pressures of a group of persons of various ages, and believed to be healthy. That they were healthy persons was more or less an assumption and quite unwarranted. Obviously, a better way would be to observe groups of persons with similar blood pressures for a number of years, and ascertain which blood pressure group would give the lowest death rates, with suitable precautions to see that groups compared were exactly similar as to all other factors — age, sex, weight and health. Only the life insurance companies have the facilities for doing this.

A study of mortality data shows that: (a) The old rules just mentioned were fallacious, in the assumption that the normal systolic pressure (consistently maintained of course) is higher at age 60 than at age 30. The normal blood pressure (the blood pressure which gives the lowest death rates) is practically the same at all ages. (b) The high limit of normal or best blood pressure is under 130 mm., much lower than a purely clinical approach to the subject has led us to suppose. (c) Elevation of systolic blood pressure of any given amount is more serious in the forties of life than in the twenties.

For a systolic pressure of 145 mm., the mortalities will be approximately:—

Age 30 .... 40 per cent in excess of normal.
Age 45 .... 50 " " " " " "
Age 60 .... 60 " " " " " "

It follows then that when a thoughtful patient appears for a periodic health examination and is found to have consistent systolic readings of 140 or 145 mm., that the matter should not be dismissed lightly — his expectation of life is probably three or four years less than it should be, a matter of some considerable importance.

Let us now take an example to show the effect of a minor disturbance of diastolic pressure. Here the results of the studies of the statisticians are not so well crystallized, but, having due regard to the fallibility of statistics, this much is certain:—

Diastolic pressure of 105 — Mortality 150 per cent in excess of normal (*i.e.*, 250 per cent of normal).
Diastolic pressure of 100 — Mortality 60 per cent in excess of normal (*i.e.*, 160 per cent of normal).
Diastolic pressure of 90 — No excess mortality.

(The diastolic pressures mentioned are the results of reading at the fifth point, or disappearance of all sound. Fourth-point readings would be about 6 mm. higher).

The practical result of a diastolic pressure consistently maintained at 105 mm. without other blemish of any kind is that the patient is about fifteen years older than he thinks he is, and that his expectation is reduced by about 12 years.

With respect to systolic blood pressure below the average there is no trustworthy volume of statistical data available, but what studies there are suggest that in the absence of infections, Addison's disease, and overwork, and perhaps some endocrine dyscrasias, no increase of mortality is to be anticipated. In other words low systolic blood pressure *per se* is not evidence of disease; and we physicians have worried our patients needlessly on this score.

Taking another common and apparently trivial condition — arrhythmia of the pulse from extra

systoles — are these latter of pathological import in the absence of any other abnormal signs or symptoms? If we classify such patients by the frequency with which the extra systoles appear we get the following results:—

(a) Five extra systoles or less per minute — 15 per cent extra mortality.
(b) Five to 10 per minute — 25 per cent extra mortality.
(c) Over 10 per minute — 50 per cent extra mortality.

In a large group of such patients, the incidence of deaths from heart disease has been 2½ times the normal. Obviously, extra systoles are of pathological import, and in the case of a patient exhibiting them you have not done your full duty by him until you have eradicated all discoverable foci of infection from which bacteria or bacterial products may gain admission, and corrected his habits with respect to tobacco.

Another condition which we habitually dismiss as due to so-called "nervousness" is moderate but persistent tachycardia. A group of 47,000 such patients with pulse rates over 90 and under 100, all in excellent health otherwise, gave a death rate 47 per cent in excess of the normal. The extra deaths were due to tuberculosis, influenza, and heart disease in the younger patients, and to heart diseases amongst those past the meridian of life. Certainly, the excuse advanced in all cases, that the patient was "nervous" was in the large proportion of them not the true cause; there is an organic underlying cause which adversely affects the patient's cardio-vascular integrity.

Another condition which worries some patients and a few physicians is slow pulse. Statistics show that 366,000 persons with rates of 55 to 65 give death rates 15 per cent below the average for normal lives. Obviously a slow pulse is a desirable attribute. Another patient, in apparent health, has never had rheumatism, has no cardiac enlargement, but has from time to time an apical systolic murmur. You have told him that his heart is normal. Your opinion is amply substantiated by the fact that 17,000 such patients gave a death rate which was almost only 5 per cent above that of normal persons. But another patient is similar in all respects except that his heart is "slightly enlarged". May one tell him that he has a normal heart? In 1,600 such there are excess death rates of 75 per cent. They were for practical purposes 8 or 9 years older than they believed, and their expectations were reduced by 6 years. All investigations so far published point clearly to the following generalization. A small heart is a healthy heart, until proved otherwise. An enlarged heart is a damaged heart always, and the apology that the condition is due to participation in athletics is not a proper defense.

Another patient is comparable with the patient just mentioned, but his apical bruit is constant in all postures and at all times, and is transmitted toward the axilla, but *without enlargement,* and with no history of rheumatism. In 31,000 such there was 56 per cent extra mortality. They were seven to eight years older than they believed and their expectation was reduced about six years. Or take another patient, exactly similar, but with enlargement sufficient to detect by palpation and percussion; in 4,300 such the death rate was 101 per cent in excess of normal — *i.e.,* eleven to thirteen years beyond their years, and expectation reduced by nearly ten years.

This matter of enlarged heart is of extreme importance and interest. From a longevity standpoint it would appear that the problem of the enlarged heart is justified in receiving the large amount of attention it is getting at the present time from cardiologists and roentgenologists. Scarcely a month passes that some person does not produce a new index which purports to evaluate the size of the heart in relation to other physical constants. Analysis of these indices appears to indicate that, for practical purposes, the formula deduced by Hodges and Eyster (*Archives of Internal Medicine,* May 15, 1926) is the best, in the hands of the average internist and x-ray man. It requires no unusual technique and no considerable degree of skill, the only heart silhouette measurement involved being the total transverse diameter of the heart in the antero-posterior 6-foot plate, and the assessment is made in relation to the age, weight, height and sex. I have had many opportunities of comparing flat plates made in various laboratories on the same patients, and they give a high degree of consistency. On the other hand, the opinions of the individual radiographers as to the size of the heart were widely at variance when those opinions were based on the appearance of the silhouette area of the heart as com-

pared with the apparent silhouette area of the chest. Even those of them who made use of the cardiothoracic ratio (ratio of the total transverse diameter of the heart to the total transverse diameter of the chest) gave widely discordant results, which is not to be unexpected when one considers that the degree of inflation of the chest must have been very different in the different examinations. My belief is that so far as the investigation of the borderline states between health and disease is concerned the ancient method of percussion, to determine the size of the heart, is practically useless, and that the size of the heart can only be assessed with any considerable accuracy by resorting to the x-ray method. Those who decry the fact that we more and more use the laboratories may object to this statement. Personally, I have no objection whatsoever if the laboratory method completely supplants the time-honoured clinical method, if the laboratory method is actually better, but it must be much better.

In the foregoing examples I have attempted to convey to you that this problem of the borderline state between health and disease is an important one, and that, provided accurate methods of observation be employed and the statistical analyses of the results be carried out by competent statisticians, we shall eventually be able to explore with some satisfaction a field of medicine which hitherto we have been inclined to ignore. Every one of these small departures from normal, which until comparatively recently have meant nothing to the physician, has made itself felt in terms of longevity, with few exceptions. Some may object that there is no point is being able to accurately evaluate the effect of small departures from normal. I would offer against that criticism that the intelligent educated person is so rapidly coming to such a sufficient understanding of the problems of health and fitness that he no longer wants to be humbugged. He wants to know exactly what his abnormal signs and symptoms mean to him; how they are going to affect his future health and welfare and the welfare of his dependents. He wants to make his plans accordingly. In addition, if we are going to apply intelligently the information which we acquire by our periodic examinations of the apparently healthy, we must have a clear idea of what these things presage. To accomplish this, we must adopt the quantitative method which has produced such excellent results in the hands of the pure scientist, the engineer, and the other workers in applied science.

SURGICAL REPAIR OF FACIAL INJURIES AND HARELIP AND CLEFT PALATE DEFORMITIES

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THE surgical repair of facial injuries consists in early and late treatment. In the early treatment following automobile accidents or any injury about the face I believe that seldom should any of the soft tissue be removed at the time, and every consideration should be given to the possibility of the circulation of the part being adequate. It is likely that a certain amount of the soft tissue will lose its vitality, but in most cases there is too great a loss of tissue if all the bruised tissue is removed at the time of accident. I strongly feel that this point is of the greatest importance; some provision should be made for the replacement of the tissue which is lost at the time of accident or in the operating-room in an attempt to repair the recent injury. Further, seldom should the bony support be removed because of comminution, as very little bone will be lost even where the comminution is greatest, and I am certain that it is better to allow sequestration with a little suppuration rather than effect a clean wound with no bony support. This is of considerable importance where the lower jaw has been fractured and comminuted, as with care and proper splinting little or no deformity should result if the underlying bone has not been removed.

The finest gauge of suture should be used about the face, never silkworm-gut, or cat-gut, or dermal, and I have a great preference for horsehair or some of the new so-called plastic suture. In the absence of the finer sutures, silk

is to be preferred. One point in the after-treatment of face wounds which I would like to stress is that dressings are seldom indicated. It is much better to leave the wound exposed to the light and drying effect of the atmosphere, and give special care to each individual suture to prevent crusting and collection of any infection.

In the later treatment of facial injuries, if the skin is lost, the surgeon should admit that it is impossible to stretch the remaining skin if the loss has been considerable, and at this time he should plan for a replacement of the deficiency in skin by a full-thickness graft, Thiersch graft, pedicle or tube graft, preferably a free full-thickness graft. There are some objections to all grafts, and one is the difficulty to obtain skin, except from the face, which in any way resembles facial skin. Subsequently, scar excisions may considerably improve a facial disfigurement, and in doing scar excisions considerable time should be allowed so as not to make it a hurried operation. I think most men will agree that to obtain a really good result about the face much more time will be consumed than was thought necessary a few years ago. Patients who apply to you are mostly women, and they are quite prepared to give the matter every consideration, and are not asking for a mere excision of the scar. In excising these scars very sharp scalpels should be used, and all scar tissue removed, if thought wise, throughout the wound, and the underlying tissue approximated with the finest of silk suture. In the absence of silk, triple-o cat-gut may be used, and the wound closed with interrupted horsehair or, preferably, the so-called interrupted plastic suture. At this time the lips of the wound should be well elevated and, if the excision is of any extent it is advisable to make pressure with a sponge or gauze dressings to prevent collection of serum beneath the skin.

At this point may I interject that since 1916 skin-grafting methods have changed, and all free-grafting of skin is followed by pressure dressing, devised in various ways, but firm pressure I believe must be applied over the graft to prevent the collection of serum and blood between the graft and the raw area and at the same time force the graft well into position. To Dr. Esser, of Holland, who published his work in *Surgery, Gynecology and Obstetrics* in 1916, should be given the credit for this great advance in the transference of skin, especially free grafting. Full-thickness grafts are being used more now and with greater confidence than ever before, and in preference to the Thiersch graft, but only for well chosen areas.

In the recently injured patient where there is a depression due to an underlying fractured bone at the very earliest opportunity the depressed and fractured bones should be elevated to normal position, and some type of splint made to maintain this position. This is very important, as in order to obtain the same result at a later date considerable risk must be taken. It is needless to say that the old treatment of putting a bandage and plaster of paris outside and under the chin for fractured jaws is seldom or never used, as all surgeons must recognize its utter uselessness.

In recent injuries about the nose or cheeks, especially those due to force applied at the time of automobile or aeroplane accidents, there is likely to be some crushing of the underlying bony structures, such as depression of the nasal bones, frontal bones and in some cases of the malar bones. In the flying accident the upper jaw is more likely to be injured, and I have seen a number of cases where the fracture was bilateral, and the entire upper jaw was forced nearly one inch backwards. It is advisable to bring these bones forward at once and they must be maintained there. If the upper jaw has been forced backwards it is necessary to use some type of splint so that the upper jaw may be advanced and maintained by the lower teeth. If the nasal bones are depressed they must be elevated and special intra-nasal splints made to elevate the nasal bones, and at the same time pressed laterally, to prevent a broad nose. In these cases as well as others I make it a rule never to sacrifice soft tissue at the time of accident, or lose any bony tissue unless it is completely detached, and seldom then, as re-attachment frequently occurs. It may be necessary to supply soft tissue at a later date, but very little if any tension should be permitted, as pressure on skin from the sutures will cause a degeneration of the tissue.

Deformities of the upper and lower eyelids are largely either ectropion or entropion of the lids due to burns, and these disabilities are largely overcome by pressure skin-grafts. By

this we mean skin-grafts held against the underlying muscle by pressure of a sea-sponge or dental compound. Another deformity about the orbit which requires treatment is where the eyeball has been enucleated, and, either owing to burns, bruising or some destructive agent, considerable of the orbital conjunctiva has been lost. In these cases both the upper and the lower fornices and the eye-socket are obliterated by scar tissue. It is necessary then to reconstruct them before an artificial eye can be worn. This is accomplished by carefully excising the scar tissue and enlarging the socket inwards, outwards, upwards, and downwards to its full extent and placing in position a skin-graft over a mould of dental compound.

Where an ear has been lost from accident, speaking generally, neck tissue may be made into a tube pedicle flap, and at a second-stage operation transplanted in the form of a cylinder of tissue to the pinna of the ear, or it may be more or less made on the chest with a long pedicle extending from the region of the clavicle to the position of the former pinna of the ear. Time forbids going into these cases in greater detail.

There have recently been some improvements, at least most of us view them as improvements, which can be considered under the headings of, first, lip changes and, secondly, palate changes. I am aware that lip repairs are considered to be simpler than palate repairs, but I am firmly convinced that under normal conditions union of the palate should be obtained in close to 100 per cent. By normal conditions I mean a child between the twentieth and thirtieth month, or even later, healthy, free from exposure to measles, scarlet fever, etc. for at least three weeks, and where the lateral incisions are made posterior to the tuberosity and on the cheek side, rather than forward on the hard palate, thereby perhaps endangering the circulation of the tissue overlying the hard palate. Further, I still use wires through the soft palate, twisted over lead plates, in all my palate cases, not as a tension suture but merely to splint the palate and keep it at rest. That means in all cases an absence of tension. More recently considerable attention has been given to sound production, and poor voice has been thought due to a united but short palate. A number of surgeons, more recently Dr. George Dorrance, of Philadelphia, have recommended doing a two-stage operation, namely, making a horse-shoe-shaped incision in the palate just posterior to the outer teeth, raising a crescentic flap on both sides close to the teeth as far back as the hard palate and forcing this raised tissue and soft palate to a much more posterior position. If necessary an obturator can be placed in the opening back of the upper teeth, but this is seldom necessary. I am of the opinion that this is an operation which will give an improvement in the voice, but it should only be done in a few well-chosen cases.

During the last few years Dr. Blair, of St. Louis, has given to the profession a modification of the old Mirault operation. The modification has been so complete that I am of the opinion that the father would never recognize this as his child. Briefly, it consists in measuring the normal side and transposing these measurements to the abnormal side in such a way that when the flaps are cut on the abnormal side they will fit into denuded areas on the normal side. This operation in the hands of the men who have devised it appears to be most satisfactory. I have used it for the last two years, and, where applicable, the result has been gratifying, but considerable care must be exercised, as all the flaps are triangular and when once cut must be united to the opposite side, and on more than one occasion I have found it most difficult to make a pleasing closure. Still I believe by using this operation the results will be more uniform. For a secondary operation other plans must be made, as frequently the old Mirault operation will give adequate length without the loss of any mucous membrane. I am merely mentioning the names of operations to save time. It is always to be considered that other operations may give equally good results, but I am attempting to outline those which I have found most satisfactory, such as the Rose or Ritchie.

Another condition which is receiving more attention at present is the treatment of a deformity of the upper jaw where, owing to under-development, the entire upper jaw is in a retrograde or posterior position, even as much as an inch and a half to two inches, and, viewed in profile, the patient has a most grotesque appearance. I will not attempt to go into detail, but I would say that these cases can be greatly improved by removing the six upper anterior teeth, sometimes eight, and placing a skin-graft

high up over the malar bones on both sides and beneath the nose, and having constructed for each case a dental appliance to hold the upper lip forward. This appliance is seated in the skin-graft high up under the lip. In this way an attempt to balance the features is made, but occasionally it may be found necessary to resect the lower jaw, taking half an inch on each side and setting the lower jaw back to a position which balances with the upper jaw. This treatment seems heroic, but the results as a rule are worth while.

PRE-SACRAL SYMPATHECTOMY FOR PELVIC PAIN

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THERE are four painful pelvic conditions which have fairly consistently baffled the therapeusis and surgical ingenuity of gynæcologists. Unfortunately, they are relatively common; together they cause a great deal of suffering, and any new method of treatment offering relief will be welcomed by all workers in the pelvic vineyard. Pre-sacral sympathectomy would seem to be such a method, and the four painful conditions in which its exhibition is meeting with some success are spasmodic dysmenorrhœa, pelvic neuralgia, the intractable pain of carcinoma of the cervix, and so-called cystalgia.

The operation, which consists in removal of the pre-sacral nerve or, as it is better called, the superior hypogastric plexus, was introduced into common practice by the French surgeon, Cotte[1] in 1927. The superior hypogastric plexus is a mass of sympathetic nerve tissue — although it may occasionally form a single nerve band—from which comes part of the innervation of the rectum, uterus and bladder. It is derived from three main intermesenteric nerves, formed in turn from short roots from the solar plexus and the sympathetic ganglionated chain. These course down the front of the aorta to fuse at its bifurcation into the plexus which lies below the bifurcation on the sacral promontory. Fortunately, the plexus is readily available surgically, since it lies immediately beneath the peritoneum without, in most cases, exhibiting any great amount of anatomical complication. It is shaped roughly like an isosceles triangle, and covers the interval between the two iliac arteries. In all my own cases it has been of this nature, although occasionally, as I have already stated, it may take the form of a single or a double band. Its posterior relations are important in that the left iliac vein is interposed between it and the glistening fascia covering the promontory in the upper left angle, and the middle sacral vessels run down the midline and may be mistaken for part of it. Laterally lie the two iliac arteries, and occasionally the ureters present themselves in the extreme lateral dissection, particularly on the right side, while on the left the inferior mesenteric stem may cross the field, as has happened twice in my series. In front it is covered only by peritoneum to which some of its nerve strands are often loosely attached, and from which they must be dissected cleanly. Davis[5] has seen an accessory ureter in the midline on three occasions, closely simulating a single large pre-sacral nerve. In one case of low bifurcation of the iliacs the inferior mesenteric trunk was found running vertically downwards in the midline. I have not seen an accessory ureter in my own cases, but in two of them the inferior mesenteric trunk ran down along the left edge of the sheaf of nerve tissue and it required some care and trouble to dissect it free without injury.

Its function has not yet been clearly worked out, nor the manner in which the operation for its removal brings relief. According to Davis its effect is motor, sensory, vasomotor, glandular and nutritional upon the pelvic organs. The theories as to the *modus operandi* of relief are as follows (Davis). (1) The relief is due to the severing of sensory fibres, which may be either specific or derived from cerebrospinal sources. (2) The pain is vasomotor in origin, the result of an imbalance in the sympathetic system. Resection of the plexus acts by restor-

ing this balance. (3) The relief of the pain is the result of vaso-dilatation, the subsequent increase in blood supply allowing of more efficient removal of metabolic products.

The first of these theories has not yet been verified anatomically, and it is therefore held by most investigators that the relief of pain resulting from the operation is vaso-dilator in origin, the exact mode of action being unknown. Such sequelæ of the operation as the immediate flow of blood noted by some authors and the increase in menstrual flow in those cases where it has previously been scanty and irregular would certainly seem to point to a vasomotor influence. On the other hand, insofar as the relief of pain in spasmodic dysmenorrhœa is concerned, there may be a motor factor. Chassar Moir,[13] in his experiments recording intra-uterine pressure, has found that during the heights of contraction in dysmenorrhœa, the pressure may rise to 150 mm. of mercury. Since this is higher than the normal general blood pressure the intra-uterine vessels must be squeezed dry of blood and be in an ischæmic state, which may account for the pain. It is possible, then, that the operation works partly by preventing these severe contractions through a motor inhibition.

The operation is performed somewhat as follows. The patient is put in a high Trendelenburg position, and an incision made slightly to the left or right of the midline, extending from about an inch and a half above the umbilicus to the same distance above the symphysis. The intestines are packed upwards and the peritoneum covering the bifurcation of the aorta brought clearly into view. A bulging, redundant sigmoid should be covered with a swab and held out of the way with a separate side retractor. An incision is now made through the peritoneum, extending from about an inch above the bifurcation to the lower edge of the sacral promontory or lower. The two leaves of peritoneum are lifted with forceps and dissected clean of any clinging tissues until the common iliacs are in plain sight on each side. With the arteries cleaned, the plexus is now seen as a sheaf of tissue between the two vessels. It is now dissected away from the iliac artery on one side. Some recommend that this be done first on the left, but I have found it easier to start on the right. With both arteries cleaned of nerve tissue on their inner aspects, the curved dissector is passed behind the bundle, lifting it from the structures below. In doing this one keeps in mind the left iliac vein, to which damage may be done now. Having got the dissector under the bundle, the sheaf of tissue is grasped at about the level of the bifurcation with an artery-forceps and severed above. The plexus is then dissected cleanly downwards from the vein and the glistening fascia covering the promontory for about an inch and a half, and severed below. In doing this, care is taken not to include the middle sacral artery which may look like a nerve fibre, and which, if cut, will retract and cause troublesome bleeding, as I found in one of my first cases. There will be some welling of blood from the cut ends of the plexus, but this will stop shortly under gauze pressure. This completes the operation, except for a continuous stitch to close the peritoneum. I always send the resected nerve sheaf to the laboratory to have it examined for the presence of nerve tissue—a precaution which I found very comforting in my earlier cases.

Let us now proceed to the indications for and results of this procedure.

Spasmodic dysmenorrhœa.—Whether or not we regard this affliction as the exhibition of a neurosis or the result of some subtle physical derangement, there can be no doubt that, generally speaking, our treatment of the well-established case has depended for its success on the all too uncertain benefits of a dilatation of the cervix. True enough there have been cures with emmenin, with the institution of such hygienic measures as exercise, the relief of constipation, and a greater physical freedom, through the use of certain sedative drugs, and with straight suggestion alone. But, when the patient has run the length of all these, our last resort, short of an old maid's hysterectomy, has been dilatation, with or without the use of a stem. Using dilatation we could prognosticate that roughly 25 out of every hundred women would be cured, 25 would receive no benefit whatsoever or be made worse, and 50 would receive benefit, varying from complete cure to complete failure. In going back over my own cases of spasmodic dysmenorrhœa treated by dilatation and the use of a glass stem I find that this percentage has been pretty well maintained in so far as the successes went, but that the number of complete failures was much

higher than 25 per cent. Furthermore, I have found that in those who received partial benefit there was a distinct tendency for the pain to recur in its old intensity — the presence of pain perhaps suggesting pain. The dilatation failures presented a sorry problem. When a dilatation has failed completely it is not likely to succeed on being repeated, although if it has brought some benefit the first time it may bring completer relief when done again. But those it fails to benefit have been condemned to doping themselves with various sedative drugs, or to going on what practically amounts to a "drunk" for the first day of each period. For such the approach of menstruation is nothing short of an advancing horror.

In the treatment of dysmenorrhœa by presacral sympathectomy Cotte[2] claims 95 per cent of cures. Davis,[6] on the other hand, has obtained only a 50 per cent one-year cure rate. Donaldson,[7] following up 16 cases, found that 2 were completely free from pain, 9 had slight pain, and 5 had definite pain—but of these five four had much less pain than formerly. Forsdike,[8] with 8 patients, got complete relief in 2, relief to the extent that they could continue work during the period in five, and no relief in one. I have treated 6 cases with the following results:

1. This patient estimates that she has obtained about 70 per cent relief. The pain is now quite bearable, only lasts for part of the first day, and necessitates neither lying-up nor taking sedatives. She is quite satisfied with the result.
2. This patient has obtained a 100 per cent result. She has now neither pain nor discomfort.
3. This patient has obtained a 100 per cent result. She has now neither pain nor discomfort.
4. This patient has obtained practically no relief. She had also constant bilateral pelvic pain which has been relieved by about 50 per cent. She is not satisfied with the result.
5. This patient has obtained a 90 per cent result. She still has some hypogastric and iliac pain on the first day, but does not have to lie up or take sedatives. She is satisfied.
6. This patient has obtained a 70 per cent result. She still has some hypogastric pain the first day, but does not have to lie up or take sedatives. She is satisfied.

All of these patients had been treated previously with sedation and the institution of a proper hygienic régime, in so far as that was individually possible. Four of them had had previous dilatation of the cervix without result (one had had two dilatations). Of the other two one, a girl who was working, insisted that I do that operation most likely to result in a cure.

Pelvic neuralgia.—The choice of this title to designate a baffling group of cases is an earnest of our ignorance. It includes those conditions so often diagnosed as chronic salpingitis, chronic appendicitis, cystic ovary and ovaritis, which, on operation, present no gross pelvic lesions. This is the type of case so often treated by the resection from an ovary of a Graafian follicle in the belief that the follicle was a cyst. If the previous operative procedure in the many cases of this nature that have subsequently come my way is any criterion, thousands of innocent Graafian follicles have thus been flopped into the kidney basin the world over. The sort of history one so often gets in this type of case is that the appendix was first of all removed, without relief, and then the partial or complete ovarian resection—likewise without relief. These cases resolve themselves into two main clinical groups. (*a*) Those with constant right-sided pain, which may or may not be worse at the time of the periods, and which are usually diagnosed chronic appendicitis. There is an absence of a history of an attack or attacks of acute appendicitis; the pain has always been on the right side and is never associated with midline colic; the point of maximum tenderness is definitely below McBurney's point, and bimanual examination practically always reveals distinct tenderness in the right ovarian region. (*b*) In the second type of case the pain is either on the left side alone, or on both sides, and is therefore not diagnosed chronic appendicitis except by surgeons with the most elastic ideas on that disease. In some of these cases the pain may be so acute as to simulate bilateral acute salpingitis, and they are usually so diagnosed. Then there is a vaguer type of case, with bearing down pain in both iliac regions and a general lower abdominal distress, accompanied sometimes by "bloating". In all these cases there is pelvic tenderness and hyperæsthesia of a varying degree of severity, and in some there is tenderness over the bladder and frequency and painful micturition, with a normal urine. But in addition to this group, in which no pelvic lesions are demonstrable at operation, there is a class of case with pelvic pain where definite lesions are present, such as a buried adherent ovary following a previous operation, milder degrees of chronic salpingitis, where the pain seems out of proportion to the pathological manifestations,

"adhesions", small fibroids, definitely cystic ovaries. The French school believe that in such cases a complete cure is much more likely if a sympathectomy is done along with the removal of the pathological conditions.

In the relief of this condition by sympathectomy Wetherell[15] reports 4 cases, all of which were completely relieved. In 3 of his cases, however, he corrected other pathological disorders. Behney[4] reports that in 5 patients who had pelvic pain associated with dysmenorrhœa, only 3 were completely relieved of the dysmenorrhœa, while all were relieved of the pelvic pain. Counsellor and Craig[3] report 9 cases with 100 per cent relief, 2 with 95 per cent, and 3 with 75 per cent. Among my own cases there were 11 who complained of pelvic neuralgia, of whom 4 also had dysmenorrhœa.

1. Severe bilateral pelvic neuralgia. This patient had had two previous operations for the same condition. At the first the left tube was removed; the second was a total hysterectomy: neither relieved her in any way. At operation the remnant of the left ovary was found embedded in adhesions and was removed before doing the sympathectomy. The pelvic pain has entirely disappeared, but the patient continues a nervous wreck as a result of her long previous dolors.

2. This patient had constant bilateral pelvic pain, and has obtained complete relief.

3. This patient had constant pain in both iliac regions for three years, was sensitive on bimanual examination all over the pelvis, including the bladder, and had frequency with painful micturition and a normal urine. The pelvic pain and the cystalgia have completely disappeared.

4. This patient had bilateral pain for over a year, and was very tender in both ovarian regions on bimanual examination. She lost 50 per cent of her pain as a result of the operation.

5. This patient had bilateral pelvic pain and dyspareunia for three years, was acutely tender in both postero-lateral fornices (uterus normal in position) and on moving the cervix. She has had no pelvic pain or dyspareunia since the operation.

6. This patient has had bilateral pelvic pain for ten years, which has been much worse since the birth of twins, two years ago. She had an appendectomy for it (the pain was worse on the right side) six years ago, and four years ago had a "cyst" removed from the right ovary. Neither operation did her any good. She has now lost entirely her right-sided pain, but some remains on the left side.

7. Pain in both iliac regions for some years. Appendectomy and removal of right ovary were done in another hospital without relief. Tender in both iliac fossæ and across midline; bladder tender on bimanual examination. Urine normal. Tender in both postero-lateral vaginal fornices. The patient's sister, who saw her two weeks previously, said that she had been entirely free of pain since leaving hospital and was now doing heavy work.

8. Pain across lower abdomen for some years, no worse at time of periods, and without menorrhagia. Tender in all vaginal fornices. Uterus tender. Operation disclosed a small subserous fibroid, the size of a golf ball, which was enucleated. Since the sympathectomy the pain has entirely disappeared, but patient has been quite constipated. She thinks the operation caused constipation. Pathological report on the fibroid disclosed only the usual slight hyaline degeneration.

9. Severe pain in right side ever since a total hysterectomy and bilateral salpingo-oöphorectomy for chronic bilateral salpingo-oöphoritis eighteen months before. Very tender in right lower iliac region. Exquisitely tender in right vaginal vault on bimanual. It was thought that a small piece of the right ovary had been left behind and become cystic. Operation revealed no evidence of this and no other cause of pain. Since the sympathectomy this patient has been absolutely free of pain. There is an undoubted neurotic element in this case, and I am not sanguine about the cure.

10. Pain in lower abdomen, both sides, for seven years, worse at the periods. Frequency, 7 to 8 times a day; the urine negative and the pelvic organs felt normal but were tender all over the pelvis. No pain since operation and the frequency has cleared up. No tenderness now on pelvic examination.

11. Constipation. X-ray showed general spasticity of the colon. Dull pain in left iliac fossa. Hysterectomy for fibroids 10 years ago. Definite tenderness in one spot in the left postero-lateral vaginal fornix. The left ovary was found normal at operation, and no obvious cause for pain was discovered. This patient has lost her iliac pain, but constipation and some low abdominal distress remain. This case presents a definite failure, as the patient is not satisfied that the operation has been worth while.

In none of this group, except Nos. 1 and 8, was there any gross pelvic lesion, nor any uterine or ovarian displacement found at operation; the pelvic organs, or what remained of them, were normal in every way. It would seem then that in this troublesome type of case the operation offers even greater possibilities for relief than in dysmenorrhœa.

The intractable pain of carcinoma cervicis.—We all know how this pain, which may be either in one or both sides of the lower abdomen, down the legs, in the rectum or vagina, or in the sacral region, can make the patient's life one drawn-out agony. It may, following treatment with radium and x-ray, exist for a long time before death puts an end to it. To hold it even in partial check requires practically constant and profound drugging with morphia. Cotte and the French school report many cures following sympathectomy. In the treatment of 10 such cases Greenhill[16] obtained complete and instantaneous relief in all. I have done a sympathectomy in 3 such cases.

1. Severe pain in the left side of the abdomen and down the left leg, with sacralgia. While in hospital the patient seemed to have obtained some relief from the operation, but on returning home the pain has become as severe as ever.

2. Severe pain in left side and back following radium. Evidence of a gland mass extension in left obturator region. This patient estimates that she has obtained about 60 per cent relief, and is glad she had the operation.

3. Severe pain in both iliac regions and back following radium. Evidence of extension of growth along both sacro-iliac ligaments. This patient's doctor reports

that the abdominal pain has been relieved, but that there is considerable rectal pain, for which she has to have sedatives. He does not feel that the operation has done her much good.

In this group, then, the operation has not proved itself of any great worth in my hands. These patients would probably have done better with alcohol injections aimed at the posterior nerve roots involved.

Cystalgia.—This condition may or may not be associated with an intractable chronic cystitis. While it may occur as part of the picture in cases of pelvic neuralgia it is often present with a normal urine and no other symptoms. I have treated only one such case in this series—No. 3 of the pelvic neuralgia group. She obtained complete relief from the frequency and pain. Douglass[11] reports that in 3 out of 5 cases of intractable interstitial cystitis he got satisfactory results following sympathectomy. He says: "It seems that the most gratifying results of sympathectomy have occurred in those patients who had exhibited prior to operation a definite spasticity of the internal sphincter as well as other signs of excessive activity on the part of the sympathetic innervation."

THE EFFECT OF THE OPERATION ON MENSTRUATION

De Courcy[10] states that menstruation regularly takes place within 48 to 72 hours after sympathectomy, no matter at what time in the menstrual cycle it is done. Fontaine and Herrmann[12] state that such bleeding occurs only if the last regular period ended more than 4 or 5 days prior to operation. They do not believe it to be a normal period but to result from the intense pelvic congestion that follows the nerve section. In my own group one case came on to bleed the day following operation, and two others within five days. In these cases the bleeding had all the characteristics of menstruation. It is also the experience of some workers that the operation brings about a regular normal menstrual flow in those cases who have previously had scanty and irregular or excessive losses. This occurred in two of my cases. One of the dysmenorrhœics who had scanty and irregular bleeding now has a regular, normal flow; one of the pelvic neuralgics whose periods had previously lasted from 5 to 12 days now menstruates for 3 to 4 days. Cunliffe Shaw[14] has had similar results. Some writers describe an increase in the flow of urine, and early, easy movements of the bowels following operation. This was not noted in my cases.

It would seem then that in presacral sympathectomy we have an operation which will bring some measure of relief to (1) those cases of dysmenorrhœa which less drastic forms of treatment have failed to cure; (2) those pelvic neuralgias who have suffered so savagely from bootless appendectomies and ovarian resections; (3) certain cases of pelvic pain complicating carcinoma cervicis where there is no involvement of cerebrospinal nerves; (4) cystalgias, with or without chronic cystiti-

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ADDICTION LIABILITY OF CODEINE.—Himmelsbach observed 7 white men who were addicted to morphine and maintained on codeine. Stabilization on morphine was effectively maintained by the administration of four daily injections of codeine. None exhibited abstinence symptoms after satisfactory adjustment of the individual doses. During the period of transition to codeine all exhibited mild evidence of abstinence at some time. During the eight to fourteen day period of stabilization on codeine, 5 of the subjects exhibited mild abstinence at some time and 2 were completely stable throughout. All were thoroughly stable for the majority of this period. After abrupt and complete withdrawal of codeine, mild evidence of abstinence appeared during the first thirty hours and then suddenly became severe in all cases, and continued in its severity until the fourth or fifth day, when recovery set in. The subjects were fit for discharge by the fourteenth day after withdrawal. This picture differs from that of abrupt morphine deprivation only in regard to the delayed onset of severe abstinence manifestations. All the subjects were aware of the substitution, but voiced no objections to it and asked for the substituted product during the acute severity of abstinence. The ratio of daily effective substitution doses of codeine for morphine ranged from 3.8:1 to 8:1; the median ratio was 5:1.—*J. Am. M. Ass.*, 1934, **103:** 1420.

THE MINIMAL EFFECTIVE DOSE OF HISTAMINE IN THE DIAGNOSIS OF ACHLORHYDRIA*

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HISTAMINE has been recognized for some ten or twelve years as an active stimulant of gastric secretion. Many investigators have written extensively on its practical application, and today it is widely used as the stimulus of choice, particularly in those cases which fail to secrete free hydrochloric acid with the older and perhaps better known methods of gastric analysis. For a full account of the properties of this compound the reader is referred to the excellent review on histamine by Best and McHenry.[1] It is the purpose of this paper to discuss the minimal effective dose of histamine in determining the presence of achlorhydria.

The mode of action of histamine on the gastric mucosa has not been settled. Popielski believed that it acts directly on the gastric cells, while Rothlin and Gundlach thought its effect was due to vagal stimulation. Keeton, Luckhardt and Koch state that if gastrin or histamine is the physiological stimulus of gastric secretion it is probable that it is liberated by nervous influence. Sacks, Ivy, Burgess and Vandolah[2] in 1932 brought forth convincing evidence to show that the active principle of gastrin is histamine. Ivy and Javois produced secretion in a denervated Heidenhain pouch, thus showing that the process of stimulation was not essentially nervous. Gutowski in 1924 demonstrated that gastric secretion took place when histamine was injected subcutaneously into the leg of a dog, the only connection with the rest of the body being by the vascular route. Direct observation of the gastric mucosa of animals under the stimulation of histamine was observed by Brenkmann in 1929. The first sign of the effect of the drug was an intense reddening of the entire gastric mucosa. This was followed by an outpouring of secretion, especially from the mid-fundus. Brenkmann puts forth the suggestion that secretion may be due to the simple dilatation of the capillaries.

DOSAGE

Histamine, b-imidazolylethylamine, is a true amine and is a derivative of the amino-acid histidine, the base itself being the active principle in stimulating gastric secretion. As histamine is difficult to isolate in pure form it is customary to employ some one of its more easily procurable salts for clinical work (notably the hydrochloride and phosphate). On reviewing the literature for the purpose of determining the dosages used for clinical work on gastric secretion it is difficult to tell from the context of certain papers whether the dosages quoted are given in terms of histamine itself or of the particular salt used. This confusion has made it impossible to state definitely the limits of the dosages commonly administered. However, speaking in general terms, the limits may be placed between 0.15 mg. and 1.25 mg. of histamine. It would seem advisable when quoting dosages of histamine to give them in terms of the active base, regardless of the preparation used, thus avoiding confusion as to the strength of stimulation employed.

To demonstrate the variety of preparations used for subcutaneous injection and the various methods employed to estimate dosage, a few typical procedures will be quoted. Thus Carnot, Koskowsky and Libert in 1922 used histamine crystals in doses varying from 0.75 mg. to 1.75 mg., Matheson and Ammon[3] employed 1.5 mg. of ergamine acid phosphate (Burroughs and Wellcome) diluted to 1 c.c. Three milligrams of this preparation are equal roughly to 1.0 mg. of the active base. Gompertz and Vorhaus[4] gave 1 c.c. of 1:1,000 solution of histamine hydrochloride. One milligram of histamine hydrochloride is equal to approxi-

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mately 0.60 mg. of histamine. Klump and Bowie[5] used 0.5 mg. and 1.0 mg. of histamine sulphate. Comfort and Osterberg[6] and Polland and Bloomfield[12] gauged the dose according to body weight. Using histamine acid phosphate, they gave 0.1 mg. of histamine per ten kilograms body weight. Martin, Morganstern and Carroll[7] used 0.005 mg. of histamine in the form of histamine acid phosphate per pound of body weight. In comparing the intravenous and the subcutaneous methods of injection, Weiss, Robb and Ellis[8] believe that there is an individual variation in the speed of absorption by the subcutaneous route, and in addition they report that the amount of histamine entering the blood stream varies at different time intervals. They recommend the intravenous method where comparative and quantitative observations are to be made.

The constitutional effects of the doses described and their variation with the different strengths of stimulation have been fully discussed by Gompertz and Cohen.[9] Suffice it to say that in doses up to 0.5 mg. of histamine the symptoms are negligible. The local changes at the site of injection however, are sufficiently interesting to mention briefly. There first appears surrounding the point of injection an area of erythema which is usually localized but may extend in a characteristic patchy distribution over the rest of the body, most noticeably over the upper extremities, neck and chest. Following this, immediately over the puncture point a wheal appears. It may vary in size from one to five centimetres in diameter and is usually well established within ten minutes of the injection. The arm feels itchy. These physical signs soon disappear and are usually well on the wane before the test is completed. Bockus, Banks and Willard[10] have emphasized the importance of these changes and believe that they indicate that the preparation of histamine used is potent.

The toxic subcutaneous dose of histamine for man has not been definitely established. Doses of 4 mg. and 8 mg. have been given with marked constitutional effects. Schenk administered 4 mg. subcutaneously to a patient fifty years old. There was intense flushing of the face, nausea and bronchial spasm. The blood pressure dropped from 197/100 mm. Hg. to 80/45 mm. Hg. After thirty minutes the pressure had risen to 135/70 mm. Hg. Eight mg. subcutaneously, given to a patient fifty-one years old, produced arhythmia and ventricular extra-systoles. Speaking generally, it may be said that the constitutional symptoms roughly parallel the quantity of histamine used. From this it may be judged that the doses commonly employed allow a wide margin of safety.

The contraindications to the use of histamine are few. It is not advisable to inject this substance into asthmatic patients owing to its tendency to precipitate spasm of the bronchial musculature. However, in the small doses used there is little danger. Thus the writer found, using a 0.5 mg. dose on one chronic asthmatic, that the patient complained merely of a slight tightness in the chest. Histamine causes a momentary inversion of the "T" wave in lead 2 of the electrocardiogram consequently it is possibly not advisable to use histamine in cases of coronary occlusion, although no instances are reported in which untoward symptoms have occurred. Hartfall and Witts[11] report one case in which the swelling of the arm following injection did not subside for forty-eight hours.

From the clinical standpoint, and also from the viewpoint of research work where repeated analyses are necessary, it is particularly desirable that patients should be subjected to the least possible discomfort. Hence the dose of histamine that causes the least constitutional symptoms and yet acts as an effective stimulus is the ideal one. In 1929 Gompertz and Cohen[9] carried out comparative studies, using small doses of histamine. They subjected a series of persons to subcutaneous injections of histamine hydrochloride in the following doses: 1.0 mg., 0.75 mg., and 0.25 mg. From the results of their work they conclude, "It is here shown that as little as 0.25 mg. of histamine hydrochloride suffices to demonstrate its action as a gastric secretory stimulant. This dose is devoid of untoward effects or any unpleasant symptoms whatever. Accordingly the previously recommended larger dose (0.5 mg.) no longer seems necessary nor desirable in diagnostic or therapeutic procedures". Examination of the charts accompanying this paper suggests that the individuals on which this study was conducted were normal, at least so far as their gastric secretory function was concerned.

It seemed to the present author, as bearing upon the problem of achlorhydria, that useful information might be elicited by making com-

parative studies with small doses of histamine on patients who, to use a term of doubtful significance, had pseudo-achlorhydria or were questionable cases of achlorhydria and needed a stimulus greater than the ordinary test meal to cause them to secrete free hydrochloric acid. Consequently an attempt has been made to determine whether a 0.25 mg. dose of histamine will show the presence of achlorhydria as accurately as a 0.5 mg. dose.

GENERAL PROCEDURE

Almost all the patients have been taken from the Out-patient Department or wards of the Winnipeg General Hospital. As the major part of this work has been conducted in the afternoons the fasting period prior to the fractional analysis is considerably longer than usual. Fractional tests are generally performed first thing in the morning, the last food being taken into the stomach roughly twelve hours before. In this work, with the exception of bed patients who were examined in the morning, the average fasting time has been increased to between sixteen and eighteen hours.

Types of stimulation used.—A (1) test meal—eight arrowroot biscuits and 12 oz. water; (2) histamine—the preparation used was ergamine acid phosphate (Burroughs Wellcome & Co.) Each tablet contains 0.003 gram of ergamine acid phosphate, which is equivalent approximately to 0.001 gram of the active base. One tablet was dissolved in 2 c.c. of sterile water before using. The injection of 0.5 c.c. of this solution is equivalent to that of 0.00025 gram, or, more conveniently, 0.25 mg. of histamine base.

Methods employed in chemical analysis. — Free hydrochloric acid and total acid have been estimated by titration with N/10 sodium hydroxide, using dimethylazobenzene (Töpfer's reagent) and 1 per cent alcoholic phenolphthalein as indicators. The readings for free hydrochloric acid have been taken at approximately a pH of 2.8 (salmon-pink colour with Töpfer's reagent) and the figures for total acid at a pH between 8.0 and 9.0 (first permanent pink with phenolphthalein). The usual routine was adopted,[5] using a standardized burette and standardized N/10 sodium hydroxide. In most cases 5 c.c. of filtered juice were used for titrations; in a few only were smaller quantities available.

Peptic digestion has been estimated by Mett's method, as described by Hawk and Bergeim. However figures for peptic digestion are not here recorded, since the levels of peptic activity have been so completely irregular that conclusions drawn from these figures would be of doubtful value.

Fractional test procedure.—The procedures with the test meal and the histamine stimulus have been practically identical. The general method employed is described below, and the differences in the two types of analysis pointed out.

The patient is told to report at twelve o'clock noon, having been instructed not to eat anything from the night before. If he feels unable to go so long without food he is allowed to have a cup of tea or a glass of milk not later than eight o'clock in the morning. Prior to commencing the test, the patient is instructed to expectorate any saliva that collects in the mouth during the test. In this work the Levine duodenal tube (size No. 16 and No. 12) has been used. This tube can be passed readily by the nasal route, which method has been almost entirely adhered to on account of the slight discomfort it causes. The Levine tube and the nasal route cannot be too highly recommended. When the tube is considered to be in place (and this is a point in which experience is a great help), usually about the 20 inch mark, it is clamped off and allowed to remain for two to three minutes. The patient is told to stand during this period. Using a small flexible tube, this procedure is recommended as it allows the tube to extend to its full length in the stomach, thus lessening the possibility of the kinking and twisting which sometimes occurs when a tube is passed quickly. At the end of this time the patient is again seated and the fasting contents are withdrawn with a 20 c.c. Luer syringe. Following each aspiration it has been the practice to force a few cubic centimetres of air into the stomach, to empty the tube of its contents, thus preventing contamination of the next sample with fluid remaining in the tube from the previous withdrawal. After fifteen minutes a second sample is withdrawn. No attempt has been made in this work to correlate the findings of this second sample, as the conditions essential for the study of "basal" secretion have not been adhered to. The value of this aspiration in the mind of the writer lies in the fact that it serves as a second check that the stomach is empty prior to stimulation. The empty stomach is generally recognized to be merely a potential cavity, the walls of which are thrown into folds. After removing the fasting contents, mucus and secretion withheld in the folds of the gastric mucosa are allowed to gravitate to the most dependent part and can be withdrawn at the second aspiration. This retention of secretion has been well demonstrated by Dodds and Robertson in their work on lactic acid in carcinoma of the stomach.

Following the second withdrawal the stimulus is applied. With the test meal the patient is expected to complete the meal in fifteen to thirty minutes. Using histamine the injection is made into the lateral aspect of the left arm. This particular site has no known advantages, except that it is desirable to choose one constant spot for injection, as histamine is absorbed by the venous circulation and the time interval between injection and effect should be constant. After stimulation samples are removed every fifteen minutes until the stomach is empty, or until eight samples have been obtained. With the test meal it is necessary to withdraw between 8 and 10 c.c. for each sample in order to obtain 5 c.c. of clear filtrate for chemical analysis. Following the injection of histamine the stomach is completely emptied at each aspiration and the volume of secretion recorded. In order to make comparisons of volume it is necessary to make withdrawals at equal intervals of time, and in addition the periods of aspiration should be of equal length. It has been the practice in this work to start aspirating two minutes before the fifteen minute period and to continue for three minutes following it.

Bloomfield and Polland, in 1929, and Polland and Bloomfield,[12] in 1930, have pointed out that, using the histamine stimulus, the measurement of volume and acidity of the pure gastric juice affords the best criteria for studying the secretory function of the stomach. They were able to show, by using continuous aspiration and collecting the samples in ten minute periods, that the highest acidity and the greatest volume of secretion usually occurred

at the 20–30 minute period. In this work the results are quoted according to their standards with the following modifications. Samples have been collected for fifteen minute instead of ten minute intervals, and aspirations have been taken over a fixed period of time, but have not been continuous. The results as a whole have corresponded closely to their findings, except that, as would be expected, the figures for volume are a little higher. On this basis, instead of reporting the height of acid and the volume of secretion for each fifteen minute period, the figures quoted in this paper represent the greatest fifteen-minute secretory volume and the highest fifteen-minute acidity.

Twenty patients were selected for this study, all of whom had failed to secrete free hydrochloric acid with two one-hour Ewald tests prior to undergoing this investigation. All were subjected to three fractional tests in the following order: (1) fractional test meal; (2) histamine, 0.5 mg.; and (3) histamine, 0.25 mg., subcutaneously. The tests were conducted in the majority of cases on consecutive days, all tests being completed within a week on any one patient.

It is well known that cases exist in which free hydrochloric acid is not found following the one-hour test and yet its presence is detected when the fractional method of collecting the gastric contents is used. This discrepancy in the one-hour test results largely from the non-removal of the fasting contents before the test is started, and also from the fact that only a single aspiration is made one hour following the meal, thus failing to detect those cases in which the free acid secretion is delayed beyond one hour. Again it is recognized that there are cases in which free hydrochloric acid fails to appear following the fractional test meal and yet it may be found in normal quantities when the histamine stimulus is used. The significance of this phenomenon is not truly understood, but may be explained for the purpose of this paper by assuming that in certain individuals the gastric secretory apparatus is inhibited or is hypo-sensitive, thus requiring a greater stimulus to cause it to perform its function. It is obvious that this process is a complicated one and probably results from one or more of several causes. In the first place it may be due to some pathological process affecting the gastric mucosa itself, such as chronic gastritis, which may later lead to atrophic gastritis and true achlorhydria. Again, it may occur as a secondary state when the normal sensitivity of the gastric secretory mechanism is inhibited by some constitutional condition, as for example, hyperthyroidism,[13] during acute fevers,[14] or mere debility. Thirdly, there appear to be cases which cannot be associated with any known cause, direct or indirect, but in which a stimulus greater than the ordinary test meal is required to cause secretion of free acid. These cases belong to that indefinite group which is usually referred to as pseudo-achlorhydria. The question of gastric anacidity has been most ably discussed by Bloomfield and Polland[15] in their recent monograph. For the purpose of the present study the causes of this hypo-sensitivity are not important. It has been mentioned merely to emphasize its existence and that it is in cases exhibiting this phenomenon that the effect of the two strengths of histamine has been compared. Thus a group of cases giving a negative one-hour Ewald test will include: (1) cases of average sensitivity which have been missed by the error of the one-hour test; (2) cases which have a hypo-sensitive gastric secretory apparatus; (3) cases of true achlorhydria.

For the purpose of comparing the volume of secretion and the height of free-acid response following the two doses of histamine, the 20 cases under consideration have been divided into four groups as follows: (1) No free acid with two-one-hour Ewald tests, but free acid with the fractional test meal and with histamine in both 0.25 mg. and 0.5 mg. doses. (2) No free acid with a fractional test meal, but free acid with histamine in both 0.25 mg. and 0.5 mg. doses. (3) No free acid with histamine in 0.25 mg. dosage, but free acid with the 0.5 mg. dose. (4) No free acid with the 0.5 mg. dose of histamine.

The findings in Groups 2 and 3 were confirmed by repeated tests.

With the exception of Group 1, which is composed probably of cases of average sensitivity, it is believed that the groups are indicative of decreasing gastric sensitivity, the cases in Group 4 having completely lost their ability to secrete free hydrochloric acid.

The figures in Table 1 have been obtained by taking the mean for the combined cases that fell in each group and represent the greatest fifteen-minute volume of secretion and the

highest fifteen-minute acidity. It will be noted that in all groups the greatest volume and the highest free and total acidity occurred following the 0.5 mg. dose of histamine. The greater stimulating effect of the larger dose is readily seen in Groups 2 and 3. Even in Group 4 where there is no material difference in the total acidity figures, the volume of secretion is greater with the 0.5 mg. dose. The figures in Table I

TABLE I.

	Volume c.c.	Free Hydrochloric Acid c.c.N/10 Na. OH.	Total Acid c.c.N/10 NaOH.
Group 1—10 cases.			
F. T. M.* ..	–	25	41
Hist. 0.25 mg.	23	50	64
Hist. 0.5 mg.	30	51	69
Group 2—2 cases.			
F. T. M. ...	–	0	8
Hist. 0.25 mg.	15	25	43
Hist. 0.5 mg.	23	57	70
Group 3—2 cases.			
F. T. M. ...	–	0	14
Hist. 0.25 mg.	10	0	16
Hist. 0.5 mg.	14	12	30
Group 4—6 cases.			
F. T. M. ...	–	0	2
Hist. 0.25 mg.	9	0	3
Hist. 0.5 mg.	14	0	5

* F. T. M.=Fractional test meal.

TABLE I.—Volume of gastric secretion and acid response following the subcutaneous injection of histamine in 0.25 mg. and 0.5 mg. doses.

are graphically represented in Chart I, which shows at a glance the relative stimulating effect of the two doses of histamine.

Regardless of the volume of secretion and height of acidity, the question of greatest importance is, will the 0.25 mg. dose of histamine stimulate the secretion of free hydrochloric acid as frequently and as accurately as the 0.5 mg. dose? Comparing the proportion of the total group of 20 cases that failed to secrete free acid following the two dosages, it was found that histamine, 0.25 mg., failed to reveal free acid in 8 cases (40 per cent); 0.5 mg. failed to reveal free acid in 6 cases (30 per cent).

Insufficient cases have been studied to estimate with any degree of accuracy the exact error of the smaller dose compared to the larger, but it can be seen that the 0.25 mg. dose of histamine is definitely less accurate than the 0.5 mg. dose in determining the presence of achlorhydria.

SUMMARY AND CONCLUSIONS

An attempt has been made to compare the stimulating effect on gastric secretion of a 0.25 mg. and a 0.5 mg. dose of histamine, on a selected group of patients, with the object of determining whether the smaller dose of histamine would detect the presence of achlorhydria as accurately as the larger dose. The following conclusions have been drawn from the results of this work.

1. In cases of normal or average sensitivity of the gastric secretory apparatus the 0.25 mg. dose of histamine is an effective stimulus, producing a response approximating that of the 0.5 mg. dose. This finding compares favourably with that of Gompertz and Cohen, who em-

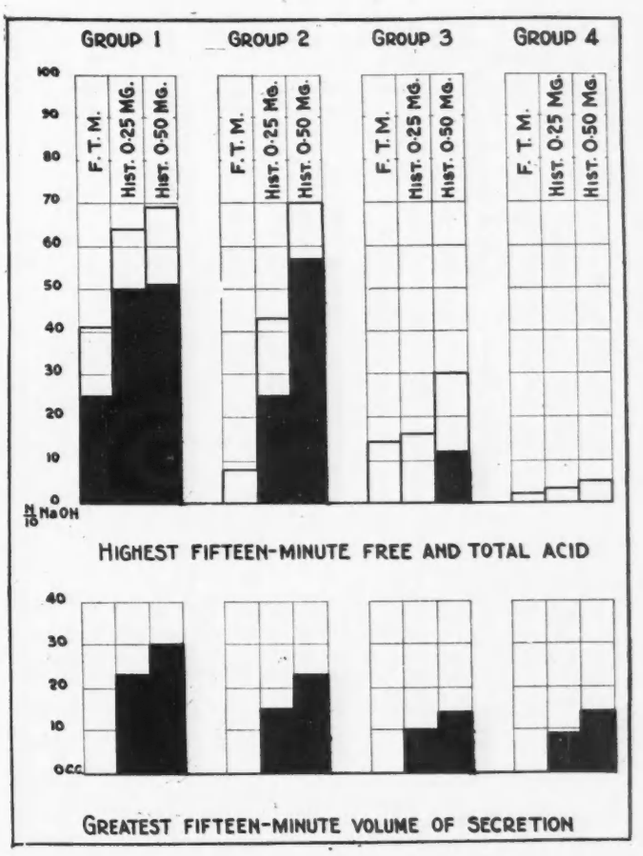

CHART 1.—Showing the relative stimulating effect on gastric secretion of histamine in doses of 0.25 mg. and 0.5 subcutaneously. The figures represented have been obtained by taking the mean for the combined cases in each group. In each case only the greatest fifteen-minute volume of secretion and the highest fifteen-minute acidity have been considered. Group 1.—Patients with normal or average sensitivity of the gastric secretory apparatus. Groups 2 and 3.—Cases with diminished sensitivity of the gastric secretory apparatus. Group 4.—These have completely lost their ability to secrete free hydrochloric acid. The greater stimulating effect of the 0.5 mg. dose can be seen at a glance in Groups 2 and 3. Even in Group 4 the volume of secretion is greater with the larger dose.

ployed even smaller dosages. These investigators found that histamine hydrochloride in a dose of 0.25 mg. was an effective gastric secretory stimulus. (A 0.25 mg. dose of histamine hydrochloride is approximately equivalent to a 0.15 mg. dose of the active base).

2. In cases of pseudo-achlorhydria which have apparently a hyposensitive gastric secretory mechanism the 0.25 mg. dose of histamine produced a decidedly smaller volume of secretion and a lower acid response than the 0.5 mg. dose.

3. The 0.25 mg. dose of histamine is definitely less accurate in determining the presence of achlorhydria than the 0.5 mg. dose. In clinical tests, where the possibility of achlorhydria is to be considered, no dosage less than 0.5 mg. of histamine should be employed.

4. For the purpose of clarity it is advisable to quote dosages of histamine definitely in terms of histamine base, regardless of the preparation used.

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MANIPULATIVE SURGERY*

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MANIPULATIVE surgery is a part of general surgery, and a large part of the field of orthopædics is manipulative; for example, many deformities, such as congenital dislocation of the hip, congenital club foot, and other deformities, congenital or acquired, may be corrected partly by manipulation and partly by operative surgery. However, these are not the type of conditions I wish to discuss. I wish rather to consider the less obvious conditions where the value of manipulative methods is more in doubt or less well understood, and to help you to determine where these methods may be of value.

It is hardly necessary to say that the field of manipulative endeavour applies almost exclusively to joints—joints limited in some way in their function, either by disease or injury. Everyone agrees that the usual dislocation of an elbow, shoulder, or hip, should be reduced by manipulation. Similarly, all will agree that adhesions limiting movement of these joints, whether as a residue from inflammation or injury, may be, and often are, benefited by manipulation. Now all joints are composed of essentially the same type of tissue and are subject to the same changes as the result of inflammation, whether infective or traumatic, and of course are subject to stress and resultant relative or complete displacement according to their structure. When certain conditions in these joints present themselves, our profession is of one mind as to manipulative methods having therapeutic value. There is doubt or scorn,

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however, when the question of manipulation refers to the spine, including the sacro-iliac joints, and, to a lesser degree, the feet. It is my impression that the scepticism and antipathy to the art has developed from a justifiable distrust of those who exploit rather than practise it.

I am certain that lesions of the sacro-iliac joint, in the nature of luxation or partial displacement, occur which respond very promptly to manipulative correction. The minority only are demonstrable by x-ray. It is the difficulty of demonstrating this fact by x-ray which helps to create the doubt, but when one studies the structure of this joint it is easy to understand the difficulty, so one must depend mainly upon clinical signs for a diagnosis. Even these in many cases are not obviously diagnostic, and one sometimes only makes the diagnosis positively after manipulation has given prompt relief. The sacro-iliac joint is of course subject to the same hazards as other joints, and is often the site of inflammatory attacks. The damage caused by inflammation in this joint which results in changes that are amenable to treatment in other joints is subject to the same principles of treatment as with other joints.

Now, as to the spine itself, we again have joints to deal with, and they are subject to the same hazards of disease and strain as other joints. Then why, may I ask, are they not amenable, at least in a degree, to similar therapeutic measures? Lesions such as luxations and displacements are relatively uncommon, but they undoubtedly occur; they are admitted by orthopædic surgeons to be a not uncommon occurrence in the cervical area; they have occurred to my knowledge in the lumbar area; and they are not uncommon, as can easily be demonstrated, in the lumbo-sacral area. Manipulation is the logical method of relief.

I remember my first experience of a lateral facet displacement of the 4th lumbar vertebra, which we were able to demonstrate fairly to our satisfaction by x-ray. This was while in my hospital service under Dr. Painter,[4] of Boston.

CASE 1

The patient was a young man who had come from Nova Scotia for treatment. On the second attempt under anæsthesia we succeeded in reducing the displacement, and the pain of two years' duration disappeared. The manœuvre used in this case was one of extreme flexion. This was accomplished by straddling the patient, locking the hand across under the abdomen, and suspending him well, while counter-pressure was used for flexion above and below the fulcrum made by the locked hands.

CASE 2

Another patient, aged 37, was referred on account of pain in the dorso-lumbar area, but fairly well localized over the twelfth dorsal. It had been present for two years, and was first felt during a quick turning and bending movement, to save one of her children from falling. She thought at first it would wear away, but when it did not she made different efforts to get relief. The examination was practically negative, except for the localized soreness and slight limitation of lateral bending to the right, though all movements in the extreme increased the tenderness. By x-ray we were unable to determine any definite lesion. This was many years ago, and I was more in doubt what to do than I would be now. However, I diagnosed a probable partial facet displacement of the joint, and undertook manipulation for its correction. With the patient in the prone position, my left hand on the lesion, and the right arm carrying the legs and pelvis under control, with the first firm lateral movement, I felt something give away. The patient gave a faint cry, went limp, and seemed to pass through a very transient collapse. I went no further. This patient reported the next day, and said she had had the first complete night's rest in months. She had no further trouble.

The cervical area is admitted by all to be an area where luxations are more frequent, so I will not dwell upon this, except to say that I have been able to give relief in a number of cases. In one, who had suffered seven years, relief was immediate.

I have already mentioned one case in the lumbar area where x-ray helped us, and another where it did not and where the diagnosis was one of deduction. I now wish to report a case of lateral facet displacement of the 5th lumbar vertebra on the sacrum.

CASE 3

A man, 38 years old, working as an acetylene welder, where he had to lie across railroad ties and rough ground and bend his body sufficiently to get his eye in line with the hole he was drilling, found after being in rather an exaggerated lateral bending position that when he attempted to get up he was unable to do so. From that moment onward he had pain in the back, left hip, and leg below the knee, none between the knee and hip. At rest he was comfortable, when on his feet he was in distress. This occurred in December, and I saw him the following July. He stood bent or tilted to the right. The sacro-iliac joints were negative. There was a tender spot over the 5th lumbar vertebra to left. If he forced himself to bend, the body gave a visible jerk as though it moved laterally on the pelvis. This was observed by a group present when I demonstrated him at the Western Hospital clinical meeting. At that time I had not made an exact diagnosis, so I examined him under an anæsthetic and at the same time made a gentle manipulation. However, I got no result. I then had a set of x-rays taken, and they revealed a lateral facet displacement of the left side. With this information I decided to manipulate him without an anæsthetic. I chose four sturdy house officers as assistants. I imitated for reduction the position the patient was in

when the condition started. By this manœuvre reduction was successful and was evident at once to both operator and patient. Immediately following he could stand and go through all the movements which a few minutes before were impossible.

Lesions of this nature in this area are probably relatively uncommon, but still they are sufficiently common; I have personally observed 16 cases of spondylolisthesis. In only one case did the condition develop suddenly. This was in a case of injury at seven years of age, and the paralysis was so marked that the patient did not learn to walk until twenty years of age. All the other cases developed gradually, some with very slight symptoms, but usually with a history of injury as a starting point.

Such cases demonstrate beyond doubt that this joint can be strained, that its articulating surfaces may be disturbed and finally dislocated, and that it is probably seldom diagnosed in the beginning. As to the treatment of these luxations, it is so individual that I do not believe any general rules can be laid down. Each is a problem that requires study for exact diagnosis, and from that a method to meet the condition, as in the case recorded where the method of production served as a useful guide to the procedure necessary to correct it.

I have stated that luxations are relatively uncommon, but on the other hand it is my belief that lesions, minor in nature, the result of inflammation or minor injuries, are quite common. These often give rise to local peripheral referred or reflex pains, and are very frequently overlooked. We know that spinal joints are not immune to the usual affections which attack other joints, but they have a proximity and relationship to the nervous system which other joints do not have and from this proximity and relationship irritations develop, the effects and influence of which may be far-reaching.

We all recognize the abdominal expression of pain from tuberculous lesions, or the sciatica from involvement of the foramina conducting the nerve roots which form the sciatic nerve. These are major lesions which cannot escape recognition, but if larger lesions occur, surely lesser ones, with lesser symptoms, also occur. It is these lesser lesions that we must recognize. The lesions I have in mind are, I believe, in the nature of inflammatory deposits or adhesions, the result of disease or injury as in other joints, and usually with local effect of pain in the back, but sometimes expressing pain more definitely at some distant point on account of the effects on the nerve in proximity to the affected joints. Where there are no local manifestations as a cause of such pain, often local tenderness may be revealed where the nerves supplying the area leave the spine. When such evidence is found and more serious or acute local lesion can be excluded it is fair to assume that adhesions or exudates may be a cause. If so, manipulation is a reasonable and usually effective remedy. The following history illustrates this.

CASE 4

Dr. T. brought his wife for examination on account of pain in the back which had persisted for some years. In this patient the history recorded an attack of influenza seven years before, with definite involvement of the spinal column. The distress had never cleared up. There was tenderness and some limitation of movement throughout the spine. The x-ray showed what I interpreted as a relative lessened density of the vertebræ, such as is so easily revealed in other joints where function is inhibited. We could not locate any active focus of infection. On this evidence I advised a full physiological manipulation of the spine. I prefer an anæsthetic, but often good results can be obtained without an anæsthetic, and by agreement this was tried. On the first movement of hyperextension fine crepitation, like adhesions giving away, could be heard throughout the movement. Right and left lateral bending and flexion to physiological limit was also obtained. Following this some physiotherapy was given. Later reports showed complete relief.

This is an example of an inflammatory type, with adhesions and inhibited function, with joint atrophy and pain, and there are many such, with lesser or greater symptoms. If you can exclude an active cause, manipulation will give quick and lasting relief. Some cases require some follow-up with physiotherapy and perhaps subsequent lesser movements.

CASE 5

Not long since, a patient whom I had treated some years before for arthritis came in complaining of an ache in the neck and a feeling of going to sleep whenever he sat down. This had persisted for at least two years. Examination revealed a tenderness of the cervical spine area and particularly of the 2nd occipital nerve. A free manipulation entirely relieved the symptoms.

CASE 6

Another patient had a sensation along the lower left abdomen, which kept him wanting to lift it and rub it. He had also a little difficulty in moving the bowels at times. The sensitive area on left side could be traced back to the spine at 10th dorsal to 1st lumbar. That area was noticeably rigid. Manipulation revealed adhesions and with the adhesions the disturbance disappeared.

No discussion of manipulative surgery can omit consideration of sacro-iliac lesions. They are in my experience the most common mechanical lesions requiring manipulative correction. The sacro-iliac synchondrosis is also a very common location of inflammatory invasion, but in this regard the treatment is not different from that of other joints, so I will not dwell upon it. As regards mechanical lesions there seem to be many opinions. Bankart,[1] in a recent book, says: "Strain or sprain of the sacro-iliac joint is the commonest cause of persistent pain in the lower part of the back. In this country the diagnosis of sacro-iliac strain has been regarded with a good deal of suspicion and scepticism for two reasons. First, that under the ill-conceived title of 'Subluxation of the sacro-iliac joint' it has been exploited as the alleged cause of almost every kind of pain in the back, and, secondly, that the definite neurosis which frequently, if not invariably, accompanies this condition, has afforded a wide and profitable field for every conceivable kind of physiotherapeutic 'stunting'. The sacro-iliac joint is exceedingly strong and possesses a very small range of normal movement, while the forces acting upon it are very great. If, during some sudden or unguarded movement, the joint is forced beyond its normal range, it is strained or sprained like any other joint in similar circumstances. Such strains are very common, but that any gross or demonstrable displacement or subluxation of this joint occurs, except in the rarest instances, has never been proved, either by clinical or by radiographic examination. Moreover, other joints do not remain permanently displaced after they are sprained, and there is no evidence or reason to suppose that this one does".

This author, although practically discounting the existence of sacro-iliac luxations, states "The treatment is usually simple and straightforward. The great majority of cases can be cured by manipulation, while those that are not cured by manipulation can be cured by operation, (arthrodesis)". So far as the writer knows, treatment of acute sprain by manipulation does not apply to any other joint and I have no reason to suppose it would be so successful here if something more than a sprain, namely, luxation, was not present. Fisher[2] says, speaking of subluxation: "It is probable that the irregularity of the articular surfaces of the sacro-iliac joint predisposes to subluxation. It is easy to see that a unilateral rotatory displacement of the innominate bone upon the sacrum of a fraction of a millimetre might cause acute pain and disability, and might become fixed, owing to the irregularity of the articular surfaces. To sum up, chronic strain may give rise to relaxation of the joint ligaments, which may or may not be associated with sub-luxation. Acute strain may occur alone, may be associated with subluxation, or may be followed by symptoms of chronic strain". Dr. Goldthwait[3] expresses himself thus: "I am perfectly sure that real slips at the sacro-iliac joint occur without x-ray showing, or at least without the x-ray showing it as we are able to study x-rays at the present time. To put the entire decision upon the x-ray would seem to me entirely irrational. Only in the severe cases does the x-ray usually show the displacement, which can be demonstrated so easily in other ways".

My own experience has been such that to my mind there is no doubt what happens at this joint. Many cases are sprains only, or displacements that replace themselves at the same time as the sprain, and the residue is a sprain only. Others are displacements that are spontaneously reduced under certain stress or accident, and others are displacements that remain displaced until corrected. Of these latter some can be demonstrated by x-ray and some cannot. Some years ago I reported in this Academy a number of cases of sacro-iliac displacements which responded to treatment by manipulation. Since then among a series of cases of this condition four were sufficiently marked to be confirmed by x-ray.

CASE 7

One of these was a woman with a left sacro-iliac displacement, which was so marked as to cause a paralysis of the left leg, and with pain so severe that she had to be anæsthetized to be turned in bed. In this case it was a forward displacement, though in my experience posterior rotation of the ilium is most common. The patient was seen three weeks after the occurrence. The displacement responded readily to manipulative correction; the sensation of reduction could be both heard and felt.

CASE 8

Another patient was a girl fifteen years old, who had fallen at school nine months before and broken her ankle. This got better, but she could not walk straight and complained of pain in the back. Many examinations and diagnoses had been made, the last one that it was a hysterical condition. She complained of the right leg hurting her in front when sitting, and pain in the back when trying to walk. She was also

tender over the right lower quadrant of the abdomen over the sacro-iliac joint, right side. There was a fullness over this area. She limped on the right side and leaned to the right. A diagnosis of right posterior rotation of the ilium was made and confirmed by x-ray. At manipulation under anæsthesia response was definite and unmistakable, and her subsequent recovery was prompt and complete.

CASE 9

The third case was that of a man who had been injured over six years before I saw him. He had made innumerable efforts to get relief. As he was a government employee, he was being suspected of being a fakir and he was becoming aware that his complaints were being doubted. I saw him at a clinic at Camrose, Alberta. I made a diagnosis of right sacro-iliac posterior rotation displacement. X-ray confirmed the diagnosis. When the meeting was over, with help of all the other physicians present, I manipulated and successfully reduced this displacement. A few months later the patient reported marked improvement.

When one meets conditions such as I have described, the diagnosis, since it can be confirmed by x-ray, is reasonably easy, but the treatment is difficult in proportion to the duration. However, in early and lesser lesions the diagnosis is difficult and the treatment relatively easy. The diagnosis in these traumatic cases is usually a question between sacro-iliac strain or displacement, sacro-lumbar strain or displacement, and some of the toxic conditions like lumbago. In the joint lesions passive movement causes as much distress as active movement. In other words you are determining between ligamentous tissue which is not in itself contractile and muscle tissue which is, and besides you can usually localize the most tender spot over the joint line. The traumatic lesion is usually more localized.

It is, however, sometimes more difficult to determine whether you have a partial displacement or a simple sprain. I am inclined to think, however, that where the pain is unilateral, or when it persists severely for over twenty-four hours or longer, in spite of rest, or if there is evidence of nerve lesion, from signs of numbness or partial loss of sensation, or an irregularity in the relations of the anterior or posterior spine of the ilium, or a variation in length of the legs in addition to the usual signs of pain on straight leg raising or hyper-extension, it is wiser to assume that you are dealing with a partial luxation of the joint, whether x-ray confirms it or not.

If there is no displacement the indications are rest, and this may be made more efficient, and add to the patient's comfort, by a firm adhesive plaster strapping of the back. If there is a displacement it should be treated as other displacements and immediately reduced, for which an anæsthetic is desirable, and, I think, usually absolutely necessary. Following the reduction, use some kind of fixation. Recently I have used plaster strapping as in the sprain cases instead of plaster spicas. It is quite possible we could do without anything, merely putting the patients to bed, but the support adds greatly to their comfort.

As to my method of reduction I try to decide whether I have a posterior rotation of the ilium or an anterior. If a posterior rotation I reduce by placing the patient in the prone position, hyperextending the thigh as a fulcrum and forcing the posterior superior iliac spine forward by firm pressure with the other hand. If a forward rotation, I reverse the procedure and flex the straight leg or take a short double forearm grip on the ilium and rock in the desired direction. Following that I usually do what I call a "snap the whip", by fully flexing the leg or thigh and the thigh on the abdomen, and extending with a quick snap that would have a recoil effect. I then put a firm adhesive strapping on the area for support. In a new case, not too severe, manipulation without an anæsthetic may often be effectively performed. In these the relief is immediate and unmistakable. The tendency of any displaced joint is to return to its normal position, as soon as the spasm of muscles controlling the joint has been removed, and I think the displacement in this joint is merely represented by the sharp and denser bony margin being displaced sufficiently to imbed itself and catch in the softer cartilaginous surface. The tendency is to reduction when relaxation is obtained. Many cases are on record where spontaneous reduction has occurred.

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CODEINE ADDICTION*

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THERE appears to be much diversity of opinion in medical literature as to whether or not codeine addiction exists. A review of this problem up to 1928 is to be found in "The Opium Problem",[1] extracts from which reveal the doubt that exists.

On the one hand we find statements as: "The use of apomorphin and codeine rarely if ever leads to the development of addiction to these drugs".[2] Also, Cushny[3] has said: "No tolerance is acquired for codeine even after long use, and patients may in fact appear more susceptible to the drug . . .". Again, Sollman[4] states: "Only three cases are found in the literature, and these were so mild that they could be broken in a few days without marked abstinence symptoms. The dose recorded was 2 grm. per day".

On the other hand, Lambert[5] is quoted as saying that in a series of 1,593 users of narcotics studied by him 17 "had the codeine habit". Sollier[6] states: "There is no derivative of opium . . . which does not produce tolerance under the same conditions as morphin". Lastly, according to White,[7] cases of serious addiction to codeine have been reported.

In more recent literature, Dixon[8] states: "Codeine is not a drug of addiction". At the Narcotic Drug Conference in Washington in 1930:[9] "It was the sense of the conference that codeine in itself had either questionable or practically no addiction properties". Similar statements were made to the effect that codeine was not a habit-forming drug and that it was impossible to develop a tolerance or habit by codeine. However, there was at least one dissentient voice, Dr. Woodward, who spoke as to the reality of codeine addiction. In a review of the literature on drug addiction, Adams[10] quotes three cases of codeine addiction reported by Schwartz[11] as having had severe withdrawal symptoms, and goes on to discuss the question of codeine addiction in general, concluding as follows: "Whether therefore, codeine addiction will be as rare in the future as it seems to have been in the past is a question that only time can answer". Tatum and Seevers,[12] state: "Addiction to codeine has been a rarity, with but few authentic cases on record". One writer, Heimann-Hatry,[13] reports the case of a woman who falsified his prescription to obtain a supply of codeine. The police official who investigated is reported to have said that in all his experience with drug cases this was the first time he had known of such an offence relating to codeine. Light[14] states he has seen several cases of codeine addiction.

In view of this diversity of opinion the writer has felt that the following three cases, seen within the last few months, merit a report as a contribution to this problem.

CASE 1

A female, aged 27, married. This patient was recommended to the hospital by one of the social agencies to which she was previously known. She had requested to be sent somewhere to be cured of her codeine habit, since her husband, who had long tried to help, was now threatening to separate from her. Addiction to codeine had existed for about two years, beginning with 2 grains daily, taken hypodermically, and reaching, before admission, a daily dose of 40 grains, taken intravenously in doses of 4 or 5 grains. Recently she had commenced to make hypodermic injections into the thigh since the veins of the arm were so damaged that she could no longer make use of them. The intravenous injections appeared to have been followed on several occasions by phenomena as a feeling of swelling in the face and on a number of occasions by sudden loss of consciousness; on one of these occasions she was taken to the out-patient department of another hospital.

After admission to the ward she showed withdrawal symptoms, such as cramps, sweating, feeling of coldness, and "pins and needles" sensations. In spite of large doses of sedatives she continued to exhibit these withdrawal symptoms. During the withdrawal stage she showed a tendency to bulimia and then a state of euphoria. There is little doubt that this is a borderland manic-depressive type.

Her previous history was a chequered one, and she had been a paregoric addict for two years before she began to take codeine. The husband had her placed in jail for six months to cure her of the paregoric habit, and it was some time after her release that she began to take codeine. Her need for codeine is indicated by the fact that she lives as a prostitute to get money to continue her habit.

CASE 2

A male, aged 44, single. He was admitted to the hospital with dizziness, swelling of legs, cardiac pain, swelling of face and itchiness of feet and legs, all of a week's duration. The physical findings were essentially

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those of chronic nephritis with acute exacerbations and of arteriosclerosis.

He gave a history of taking morphine, heroin and codeine, beginning 8 or 9 years ago. He claimed, however, that he had had no drugs for the past year, until he began to take codeine two months ago for pains in the feet. He had then started with 5 grains daily, and, on admission, had reached a daily dose of 80 grains. The method of administration was by the intravenous route. When without codeine for six or seven hours he would find himself becoming nervous and perspiring freely.

During his stay in hospital he had some degree of discomfort, showing irritability and complaining of abdominal pain and "pins and needles" sensations in arms and legs.

CASE 3

A female, aged 21, single. This patient was admitted to hospital with a history of fainting spells occurring once or twice weekly, and stiffness of the neck for the previous week. In view of a previous admission, three years before, when a tentative diagnosis of poliomyelitis was made, attention was directed to the possibility of organic nervous disease.

After admission she complained of severe headaches, pains in the back, and a feeling of faintness, and she vomited during the first few days. She then refused food and lay in an apparent stupor from which she could be easily aroused; recourse was had to tube-feeding at this time. The general picture was clearly psychopathic, and, after questioning, she acknowledged taking codeine by mouth and as much as 30 grains daily.

After this discovery she was given small doses of codeine, and lost all the symptoms that had been so suggestive of organic disease. During her subsequent stay in hospital the codeine was gradually reduced until she was receiving none when finally transferred to a convalescent home. She was frank about her continued desire for codeine, and stated that she would take steps as soon as possible to get further supplies.

Her personality would best be described as showing infantile characteristics. She claimed that her father, who had died 4 years before, gave her everything she wanted, and she intended that she should continue to get her own way in everything. Between the ages of 12 and 18 she had had spells of vomiting every month, associated with weakness of the left arm and leg; these spells ceased at the death of her father. After his death she attempted domestic service for a year or so, but found this work too much for her, and, in the meantime, she developed stiffness of the neck and general symptoms of weakness. Later, she developed fainting spells and attacks of an anxiety nature associated with palpitation and smothering sensations.

In this case the codeine was taken orally throughout, and there was no history or indication of any previous addiction to drugs.

DISCUSSION

The three cases reported clearly merit the title of codeine addiction and show the presence of both tolerance and withdrawal symptoms. To judge from the statements of these patients and from reports of others not themselves drug addicts but who are in touch with those who are, it would seem that codeine addiction is a more real problem than has been imagined. In the "underworld" it is a fairly common addiction, and the intravenous method of administration seems to be well known. With these data before one it is difficult to reconcile the conflicting statements quoted from the literature. It may be that in our cases the doses are larger than have been encountered by other writers. Cushny's[3] statement that no tolerance is acquired for codeine is difficult to understand, and there seems no question that there is a tolerance for codeine, both from clinical experience and animal experimentation. In all our cases withdrawal symptoms occurred, although not of the intensity and persistence usually seen in morphine addiction.

With regard to the term "addiction", it would seem that there is some difference of opinion. In this connection Tatum and Seevers,[12] state that because there are no withdrawal symptoms in the case of cocaine we should not regard this as a true addiction, but substitute some special term such as "psychic addiction". This seems a limited use of the term, and the writer would suggest that addiction be defined in terms of a persistent impulse rather than according to the presence or absence of withdrawal symptoms. Thus, even if it is accepted that the withdrawal symptoms of codeine are relatively mild compared with morphine, this does not make codeine any the less a drug of addiction. If a person prostitutes herself to get money to buy codeine (Case 1); if another falsifies prescriptions (case of Heimann-Hatry[13]); if yet another (Case 3) persistently demands more codeine and determines to get more on leaving hospital, then we should certainly speak of addiction.

It has been suggested that because morphine is increasingly difficult to obtain these addicts are turning to such drugs as codeine. Thus, Hunt[9] stated that cases of codeine addiction had always started with morphine. This is not always so, to judge from our Case 3, and from the other cases reported to us of young people who are addicted to codeine but had had no previous addiction. In any case, even when a previous addiction has existed and there is a change to codeine, this does not lessen the reality of codeine as a drug of addiction. The question of a cross tolerance may be raised here. Granted that a cross tolerance from morphine to codeine exists, and this has been shown in animal experimentation, it would be interesting to know how long after withdrawal of morphine the cross tolerance for codeine could be expected to last. In our two cases who had previously

taken drugs, one paregoric and the other morphine, etc., it would seem that such a period of time had elapsed that any crossed tolerance effect might be ruled out. We are not unmindful, however, of the possible lack of veracity found in drug addicts.

The practice as to the regulation of the sale of codeine differs in different countries. Thus, the sale of codeine is restricted in the United States, and it can only be obtained by medical prescription. The committee of the League of Nations has apparently taken the view that codeine is not a habit-forming drug, and the procedure in some countries has been guided accordingly. In Canada the import and export of codeine is regulated, but the sale of codeine is controlled differently in the various provinces. In some provinces it is possible to obtain codeine only by a medical prescription, whereas in others the sale is not restricted, apart from a control exercised by the Pharmacy Associations over the total sales of the pharmacists.

SUMMARY

1. Three cases of codeine addiction are reported; two of the patients administered the drug intravenously.

2. In each case withdrawal symptoms were present.

3. A cross tolerance from paregoric in one case and morphine in another seems ruled out by the time interval elapsing. In the third case no previous drug addiction had existed, and other cases of a like nature have been reported to the writer.

4. Drug addiction should be defined in terms of persistent impulse rather than according to the prominence of withdrawal symptoms.

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A GLIMPSE OF THE PAST: WHAT OF THE FUTURE?*

BY MAJOR F. C. CLARKE, M.C., C.A.M.C.

Calgary

FROM very early times fighting forces have been mechanized to some degree, from the day when horse-transport relieved the slave from the burden of carrying impedimenta. This transport was used chiefly for the carriage of machines of war which were too heavy to be carried by the fighting men themselves, rarely for food, because until comparatively recent times armies lived off the countries through which they moved.

All armies, down through the ages, realized the value of mobility until the sixteenth century, when the knight and the man-at-arms were so heavily laden with armour that rapid movement was almost impossible. When the development of fire-arms of various types and sizes made armour useless the value of mobility and ability to strike a blow quickly and unexpectedly was again realized, until in the late war circumstances beyond the control of either side caused a stalemate and immobility.

During the short period of open warfare at the start of the late war there were attempts at surprise, plus mobility, and it is now realized as never before that some part of an army should be able to move quickly from place to place, and when assembled at the "jumping off" place be fresh enough to strike an effective blow. All through the campaign, through the dreary years of trench warfare, we can watch the growth of this idea, in the increasing use of motor-transport, the haulage of nearly all types of artillery, except the lightest, by motor-mechanical means, and finally in the tank. At last we find its culmination on the side of the allies in the attack at Amiens on

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August 8, 1918. It is hardly necessary to repeat here the truism, or rather the truth, that one of the best means of maintaining the morale of troops in the field is the knowledge that if a soldier be wounded there are the means and the will to move him as quickly as circumstances will permit out of the zone of greatest danger into the zone of comparative safety, and that when so moved he will be efficiently cared for. Nor is it less important that wounded men who can be restored to the fighting line be made fit as soon as possible.

In trench warfare, when times were quiet, when neither side was attempting to secure a coveted position, and in the absence of raids on either side, the clearing of the wounded from the front line through the Regimental Aid-post to the Advanced Dressing Station, and thence to the Main Dressing Station was as a rule a matter of routine, unless there was heavy artillery fire directed upon the route of evacuation, or the elements converted trenches and sunken roads into quagmires. When the elements were unkind, a piece of *pavé* on which wheeled stretchers could be used, although it might be far from safe and in full view of the enemy, was hailed with a sigh of relief. After enduring conditions such as these for many months, and in some cases years, the action which commenced on August 8th was looked upon with anticipation by officers and men as an action which would be different from the attacks which had been carried out before by the Canadian Corps. The secrecy and rapidity of movement, the night marches, especially that of the night of the 7th, the assembly in the semi-darkness of the false dawn, the moving forward through another division, the rapid advance with very few casualties, the mere fact of being out and away from the trenches and shell-holes into open country with untouched woods, green pastures, and uncut wheat-fields ripening in the August sun, were so contrary to anything we had before experienced that it all seemed unreal. To realize that the enemy's resistance had been broken and that a substantial advance had been made before further resistance was met was almost unbelievable.

There are many hindrances to the effective clearing of wounded: (1) the elements; (2) physical unfitness of personnel, (there are few tasks which demand greater physical fitness and powers of endurance than the carriage of wounded by hand); (3) casualties far exceeding the expected number; (4) unexpectedly heavy enemy fire on the route of evacuation; (5) a breakdown in the quick movement of transport containing wounded due to (a) inherent defects in the transport itself; (b) congestion of the available routes for evacuation, which reduces the rate of movement to the rear down to a mere crawl, and the return of transport to the front to a pace slower than a snail's.

In the engagement of which I speak I was responsible for the movement of wounded from the Collecting Posts of the 12th Brigade to the A.D.S. that was established on the Amiens-Roye Road, near the village of Mezières. This road was a *Route National* which formed the boundary between the French and ourselves. For the wounded of this brigade it was the only route available, except to the first Division in Cayeux. The brick-kiln, which on the map extends to the north of this main road, proved to be suitable for a dressing station only in a little corner on the south side of the road, *i.e.*, in French territory. So we violated two important principles in the clearing of wounded: (1) that wounded be carried out of the danger zone as soon as possible; (2) by crossing this main road into the territory of another army.

I hardly need say that from 3 p.m. or earlier this road was a solid mass of traffic in four lines, two up and two down, each proceeding at the pace of the slowest vehicle. I have seen it stated that there were only three lines of traffic; I myself saw four. Very fortunately casualties were slight; there was no shell-fire on this road up as far as Mezières, and, most fortunate of all, there was no action by enemy aeroplanes against the highway that afternoon. We suffered from no defects in personnel, and on that day I do not remember any casualties among the bearers of the 12th Field Ambulance. The officers assigned to the Field Ambulance Bearer Parties with each battalion realized the importance of keeping the rear in touch with their swiftly-changing positions. Had our personnel been unfit, had there been heavy shell-fire or aeroplane action against the route of evacuation or in the open country, had sudden enemy resistance caused heavy casualties, I often have wondered how badly the clearing of the wounded from the 12th Brigade might have

broken down and how many wounded would have been left lying out after dark.

Since 1918 the idea of being able to throw a force sufficient in numbers and equipment against any part of an enemy's line without arousing suspicion on the part of that enemy that such a stroke is intended has been more and more developed. It is realized that only by surprise, coupled with extreme mobility and efficiency, may a decisive action be fought and months or years of stalemate and siege warfare be avoided.

Now what of the clearing and evacuation of wounded in the future? The principles of evacuation from the forward area remain the same, and, in spite of visualizing in future engagements a highly mechanized, very mobile force, which goes into action at speeds hitherto unattained, which has by subterfuge, power of rapid movement and efficiency, both of men and material, overcome all forward lines of defence of the enemy, and is going forward as rapidly as possible in order to take up positions which may be held between dusk and dawn, I cannot see any changes in the principal points in handling wounded on the field. How far this force may advance in one day no one may predict; there are too many unknowns in this equation; but the forward units of the medical services must be prepared to advance just as rapidly as the troops for whom they will care, and other routes than main arteries of communication must be used to ensure rapid evacuation.

Medical units working with the main body of troops must also be mobile and capable of rapid advance, for in case of a successful blow by the striking force, a large body of infantry must follow up, to hold and consolidate the positions that have been won. Nor will these troops march up at a mere two and a half miles an hour. They also will be moved forward by some motor mechanical means and take over from the striking force, which will retire for refitting and recuperation. This means that all field ambulances must be mechanized as thoroughly as the Cavalry Field Ambulance is today, and be conveyed by vehicles which are capable of moving rapidly over any sort of road, over open fields, or crossing small streams which are not too deep; capable indeed of overcoming almost any obstacle except trenches and canals with steep sides. A canal with stone revetments and six feet of water, or even none at all, is an insuperable obstacle to all forms of transport if the bridges have been broken down. I understand that there are lorries and ambulances which fill these requirements and will cross anything except a deep river, a canal, or deep marsh.

Since 1918 the transport of wounded by aeroplane has received much attention, first by the French, and later by the British Army in its operations in the East. The latest information that I could obtain on this subject is seven years old, and up to 1926 no type of aeroplane that was reasonably crash-proof on landing and could carry a reasonable load had been evolved. A light type, carrying one or two stretcher cases and a few walking wounded, had been used successfully in operations even in mountainous country. Nor have I any data on whether these planes will rise and land without needing so much room as to unfit them for use in the forward area of a European battlefield. In French Africa and British Mandated Territory in the East the question of room does not as a rule arise, nor would it in the Canadian west. The successful use of aeroplanes also depends on other factors; rain, hail, sleet, and mist are prohibitive to their use.

Will the enemy respect the Red Cross? I have not forgotten the general order which appeared during 1918 which absolutely forbade the display of any lights or flags which might betray to the enemy the position of any field ambulance headquarters.

The next question which comes to mind is communication between officers in charge of bearer parties and field ambulance headquarters. The only solution that comes to my mind at the present is the motor cycle, and two motor cycles per field ambulance will not be enough to maintain this very necessary service with a force which is advancing rapidly. Is the number of bearers as laid down in the present war establishment of field ambulance sufficient for effective clearing in this type of warfare? On August 8th we were fortunate in having a certain number of men from each battalion told off to help us. On the 9th the casualties were heavier and this assistance was invaluable, after that it was no more. Prisoners of course played a large part, but whether they will be

always as docile and plodding as were the prisoners we took on the 8th of August and later is open to doubt, and if unexpected resistance be encountered 25 per cent of a force can be casualties in a short time.

A word about Collecting Posts. Where possible these should be concealed under trees, behind banks, or by some means to avoid drawing shell-fire upon themselves or action being taken against them by enemy air-craft.

Case Reports

LIPOMA OF THE MALE BREAST

By T. E. Holland, F.R.C.S.(Edin.),

Winnipeg

History.—A man, aged 68 years, came with the complaint of enlargement of the left breast. Ten years before he had received a blow on the left breast, with pain and tenderness resulting. The pain and tenderness disappeared in 1½ months, but a lump persisted and increased in size, until at the end of two years it was the size of an orange, and there was occasional dull pain. Six months before consultation the patient fell, and struck his breast against a sleigh, and pain and tenderness persisted for three weeks. Following this injury the lump increased in size rapidly and persistently, until at the time of admission it was the size of a grapefruit.

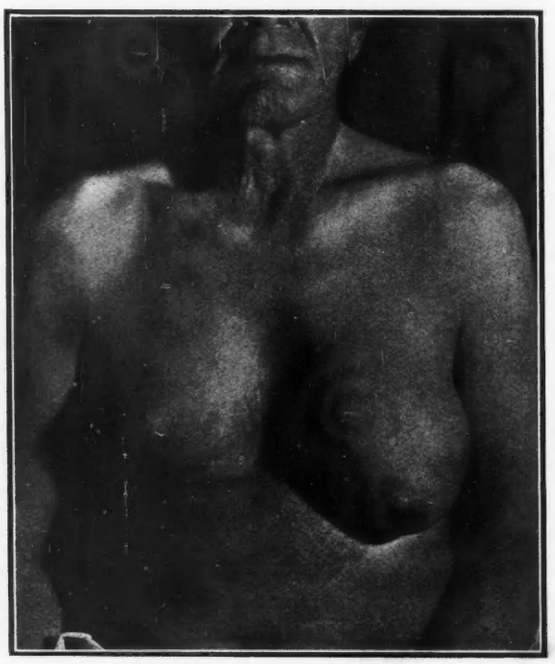
Previous history.—Irrelevant.

Examination.—In general appearance he was very fit; he did not look older than 55 years. General physical examination, including the right breast, showed no abnormality. Left breast.—A tumour was present, the size of a grapefruit, lobulated, firm in consistency, unattached to the underlying tissue or the skin, freely movable, with no retraction or enlargement of the nipple, no discharge; no axillary glands were palpable.

Provisional diagnosis: fibro-adenoma, hyperplasia of breast tissue, and chronic mastitis were considered. Carcinoma was not considered to be likely.

Operation.—The tumour was dissected out through an elliptical incision. The tumour was found to be a large lobulated mass of lipomatous tissue, with an area of necrosis in the centre.

Pathologist's report.—Macroscopic examination showed a large lipoma of the breast, weighing 750 grms. and measuring 18 by 13 by 6 cm. At one end there was an area of fat necrosis in the substance of the mass, measuring 2.5 cm. in diameter. The growth showed surrounding fibrosis. Microscopic section showed necrotic fat. Patches showed slit-like spaces, probably cholesterol, surrounded by numerous foreign-body giant cells. There were also large areas of fibrosis. The pathological diagnosis was lipoma, with areas of fat necrosis.



Comment

Of all breast tumours in men, 87.5 per cent are malignant (Cheatle). It is therefore considered advisable to operate on all such tumours and to be prepared to do the radical operation. This case was an example of a tumour rare in the male breast, as lipomata constitute less than 1 per cent of all such cases.

Clinical and Laboratory Notes

THE CARE AND PREVENTION OF IMPETIGO NEONATORUM

BY LEIGHTON C. CONN, F.R.C.S.(C.) AND J. ROSS VANT, M.C.O.G.,

Edmonton

Since 1928, when Chadwell[1] reported the success, over a three years' period, achieved in a large maternity service in the prevention of neo-natal impetigo, the routine he advocated has been adopted in many hospitals and with varying success. The original procedure consisted in, after the baby's initial soap and water bath, a single inunction with 5 per cent ointment of ammoniated mercury, followed on succeeding days by the application to the skin of sterile cotton-seed oil, to impregnate each follicle with the ointment.

One still reads, albeit more rarely, of outbreaks of impetigo. Kellert[2] described such a one, which, assuming a bullous form, spread, despite all precautions, from baby to baby. He recommended anointing with 50 per cent glycerin. Rubeson[3] advised placing the babies in small six-bed nurseries. De Lee[4] reported an outbreak of 23 cases in Chicago. He advised as treatment fresh air, sunlight, with the application to the blebs of 5 per cent silver nitrate. Swendson and Lee[5] and Rubell[6] also reported outbreaks, and agreed that efficacious treatment consisted in rubbing off the blebs with an alcohol sponge and applying thereto 2 per cent silver nitrate.

Our treatment, required much more infrequently than formerly, and offering nothing new, consists of: (1) isolation of the baby with the employment of isolation nursing technique; (2) rubbing off the blebs with an alcohol sponge, and painting the raw area with 2½ per cent gentian violet in alcohol thrice daily thereafter until healed; (3) where the fingers or toes are affected, they are separated daily, anointed thickly with 5 per cent ammoniated mercury ointment, and lightly bandaged.

It is however prevention rather than cure which in this paper we desire to emphasize. Guy and Jacob[7] have lately reported better results by modifying Chadwell's routine in two particulars. They advocate for the initial and the daily cleansing sterile liquid petrolatum, and for the single inunction a 2 per cent ointment of ammoniated mercury. They had found formerly that a considerable number of babies developed a follicular rash—chemical dermatitis—following the use of 5 per cent ointment, which at times became vesicular and proved puzzling as to diagnosis. Our experience has been comparable with that of Guy and Jacob, and since employing the 2 per cent ointment the dermatitis is found in only isolated instances. But other problems presented themselves. We found that on the sixth or seventh day following the initial inunction, in sufficient cases an impetiginous rash developed which necessitated active treatment. Accordingly, the babies were anointed a second time with the 2 per cent mercury ointment on the fifth day. No more sixth or seventh day rashes developed, but occasionally rashes developed very shortly after discharge from hospital, which appearance in the mind of parent and friend often reflected on both medical and hospital care. To obviate this, a third inunction with 2 per cent ammoniated mercury ointment, was added on the tenth day *post partum*, an expedient which has proved highly successful.

The routine treatment is as follows. The baby as soon as possible after delivery is given a castile soap and water bath, is gently patted dry, and then all skin surfaces are thoroughly rubbed over with 2 per cent ammoniated mercury ointment. Special care is taken to anoint all folds and clefts. Thereafter, each day the baby is sponged with olive oil. On the fifth and tenth day after birth the inunction with 2 per cent mercury ointment is repeated.

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METHYLENE-BLUE IN PUERPERAL SEPTICÆMIA.—C. G. N. Noë, who records three illustrative cases, recommends that every case of puerperal infection should be given an intravenous injection of 300 mg. of methylene-blue, whether the disease is localized or not. The injection should be given as soon after the onset as possible, but may be of service even at an advanced stage. In each of Noë's cases the temperature fell to normal within twenty-four hours after the injection, and rapid recovery took place. The method also deserves trial in non-puerperal infections. — *Nederl. Tijdschr. v. Geneesk.*, June 9, 1934, p. 2599.

Editorial

SOME USES OF HISTAMINE

THE studies of the physiologists and biochemists during the last fifteen years or so have established the fact that histamine is a normal constituent of the living cells of most organs and tissues. This being so, and it having been shown also that histamine is a powerful substance, acting in very small quantities, the inference seemed just that it is an important factor in bodily metabolism. Professor Abel was probably the first to suggest that it played a direct physiological rôle. Clinicians everywhere are familiar with the fact that histamine can be used to stimulate the secretion of gastric juice, particularly the hydrochloric acid component of it, and the hope was that it might prove of use in diagnosis and treatment in other directions. There is reason, too, for thinking that histamine may be in some way linked up with peptic ulcer, eclampsia, and anaphylactic and urine shock. A wide field for investigation therefore exists.

A reference may be permitted to an early observation of Sir Thomas Lewis', now well known.[1] A threefold reaction of the vessels of the skin follows all kinds of local irritation or injury — localized capillary dilatation, œdema, similarly localized, and an arteriodilator flush or "flare", the last attributable to a local nerve reflex. Lewis thought these phenomena could only be explained by the appearance in the neighbourhood of the injured epidermal cells of some chemical substance. He referred to this, with caution, as the H-substance. Later, the H-substance was identified with histamine. Dale and Harris, as a result of experiment, concluded that the H-substance was contained in an inert condition within the normal cells until released by the injury. Later, this conception was widened to hold that histamine is present pre-formed in the protoplasm of the cells of a large number of tissues and organs, and normally held there in a loose combination or through a specific impermeability of the normal cell membrane, but easily released by any agent that could upset the normal conditions of its retention.

The local effects produced by histamine on the blood vessels suggested that the topical application of histamine by means of ionization or subcutaneous injection might be beneficial in various forms of arthritis, rheumatic fever, and neuritis, and some clinicians have found this to be the case. Ernstene and Banks[2] were encouraged with the results they got from histamine in the treatment of pruritus and this substance may prove to be of value in the treatment of urticaria and eczema.

In the matter of diagnosis, Ernstene and Snyder[3] have recently tried to distinguish by means of histamine the intermediate and malignant types of hypertension from the benign form. They did this by injecting histamine and comparing the size of the "flare" produced with that of the flare obtained in normal cases. In the majority of instances the flare obtained was smaller in area than that produced in benign hypertension and in normal persons.

Some difference of opinion has existed as to whether the injection of histamine produces a systemic or merely a local effect. Probably the result depends upon the mode of administration and on the dose. Histamine administered by the mouth is inert; when given intravenously it appears to be quickly destroyed, as the effect is quite transient,[4] Given subcutaneously in the ordinary medicinal doses systemic effects, while they occur, are quite trifling and pass away quickly. The usual dose of 0.5 to

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0.75 mg. is well within the limits of toxicity. However, there is no doubt that larger doses can produce untoward systemic effects. Schenk[5] gave 4 mg. subcutaneously to a patient aged fifty. Intense flushing of the face, nausea, and bronchial spasm followed, and the blood pressure dropped from 197/100 to 80/45. Eight mg., given subcutaneously to a patient of fifty-one produced arrhythmia and ventricular extra-systoles.

Histamine in these large doses also causes a momentary inversion of the T wave in lead 2 of the electrocardiogram. Clearly, this substance should be used with caution in patients with low blood pressure or with bronchial asthma. Whether histamine, in proper doses, can be used for the relief of essential hypertension remains to be proved.

Other effects of histamine, on metabolism, have been investigated. Hiestand and Hall[6] found that the intra-muscular injection of 0.5 to 0.75 mg. usually produces a slight increase in the alkali reserve in man, but this increase was not sufficient to warrant the therapeutic application of histamine in acidosis. The same amount does not produce a significant increase in the blood sugar level in man. Klein and Mahler[7] have studied the action of histamine on certain regulatory processes of the body, notably the chloride content of the gastric juice, saliva, urine and blood and the CO_2 tension of the alveolar air. Klein and Nonnenbruch,[8] also, have used histamine to measure the functional capacity of the lung as indicated by respiratory changes in the O_2 content of the blood. Also, Alechinsky[9] has employed histamine to determine the velocity of the blood stream and thereby the functional capacity of the heart.

Bartholomew and Kracke[10] have brought forward evidence to support the view that eclamptic toxæmia is due to the action of split products of placental protein, particularly guanidine and histamine, produced during the autolysis of acute placental infarcts, and in a later communication Bartholomew and Parker[11] state that the clinical and pathological effects of guanidine, histamine (this, particularly in cases of abruptio placentæ), and peptone are strikingly like the clinical and pathological findings in the toxæmia of pregnancy. Perhaps in this direction, as a result of further biochemical investigations, some clue to the efficient treatment of this very fatal condition may be found. At any rate, histamine has proved to be much more than a plaything of the physiologists and its study seems to be full of possibilities. A very complete account of the experimental work on the action of histamine can be found in the Charles E. Dohme Lecture of Sir Henry Dale[12] delivered in 1933 at Johns Hopkins University.

A.G.N.

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THE NEED FOR UNITY

IN his most sincerely felt message for the New Year, Dr. J. S. McEachern wishes us success in our tasks, and that those tasks shall be worthy of our best endeavours and our highest powers. The latter part is the expression of feeling of one who, absorbed himself in continual and unselfish labours, knows no higher happiness, nor needs to know. There can accompany such tasks, however, an element of anxiety and stress which completely destroys the freshness and zest of hard work. The future, and the immediate present, too, holds some very insistent worries for large numbers of medical men. Much has been said in the last few years about the approach of state medicine, but

not enough has been said about the actual arrival of its advanced guard in the form of all the present free public services in medicine. It is these which are having their unwelcome, but quite natural effect, on the general practitioner's work and earnings.

Those who wish to look over the situation, and to learn something of the way in which the public regard it, should read the December number of the "Survey Graphic", which is devoted entirely to articles on the economic problems in the practice of medicine. Here one finds an economist denying any profession (including the medical) the right to dictate terms to consumers. Next comes a newspaper man's point of view; he feels that the public are getting impatient and want the profession to move a little more quickly in solving these economic puzzles of how to pay for medical care. Then comes the view of the medical man who believes that too much bureaucracy in medicine means loss of scientific interest and the general lowering of medical ideals. A more cheerful brother practitioner believes firmly in what can be done by properly organized groups of men. Then come the worries of the dentist, of the nurse, of the hospital. We turn from one to the other but no one gives a final solution. The nearest approach to that is contained in the description of how Europeans pay for their sickness, *i.e.*, by health insurance. No doubt someone in Europe could point out the imperfections of that system too, but there is something very impressive in the fact that every large nation in Europe except Italy has adopted compulsory health insurance, and even Italy has compulsory insurance for tuberculosis.

But health insurance needs the most unfaltering, the most anxious care in its development. For while it probably will be the solution of our problem there is nothing automatic about it, or if there were it would be a very unpleasant kind of automatism, in which we would become the automats. We should never forget the history of the insurance scheme in Great Britain. It came into being with little or no guidance from the medical profession and it cost several years of bitter struggle to bring its demands to a point that the profession could feel was just. There is, we believe with Dr. McEachern, no medium through which we can exert this solicitous care with more effect than our medical Association. This is probably quite fully recognized by our own members, but those outside the Association should consider how much they could strengthen the position of the profession by actively supporting it. *L'union fait la Force.*

H.E.M.

Editorial Comments

Cooperation in the Association

It has been felt for some time by the Executive of the Canadian Medical Association that a step forward would be taken if important business concerning the welfare of the profession and the Association could be placed before the general membership oftener than once a year. Under the plan hitherto in vogue reports to Council, the action taken thereon, and other necessary business are dealt with at the Annual Meeting, and the proceedings appear in a Supplement to the September issue of the *Journal*. In the interval between Annual Meetings the business is transacted by the Executive, who are given a mandate for that purpose. In addition to convening immediately before the time of the Annual Meeting the Executive meets twice a year, in the Fall and again in the Spring. This arrangement works well so far as it goes, but some think that it could be improved upon. At the present time, when important issues have arisen, and are arising continually, which should be dealt with the profession intelligently and effectively, it is of the utmost importance that they should be thoroughly ventilated. The Executive would be in a better position if it could put its finger on the pulse of the profession, and, conversely, the profession would be the better off if it could learn more promptly what is being done by the Executive on its behalf. Fuller information on both sides would conduce to efficiency and sane conclusions, and would lessen the chance of prejudice and misunderstanding. What we need in our Association is singleness of purpose, solidarity, and concerted action. This is an ideal worth striving for. We feel strongly that the scheme recently put forward by the President, looking toward a closer relationship between the Provincial Medical Associations and the National body, would go far to promote that unity of thought and action which all feel is so desirable. To further this end, also, the *Journal* will publish from time to time abstracts of the meetings of the Executive Council and, at times, reports of special committees where they deal

with vital subjects. All our members should read these, and if any feel moved to offer constructive criticisms or advice we hope they will write for our Section of "Letters, Notes & Queries". Every second month we plan to print the names of the Chairmen and Secretaries of Special Committees, who, we believe, will also be glad to receive comments from the membership at large. A.G.N.

Manipulative Surgery

Dr. Wright, in his paper in this issue (page 64) has managed to "chisel in" on two different departments of surgery, namely, general surgery and orthopædics. This has been fairly easy to do, as the first can hardly be regarded as a specialty, whilst the second is continually finding itself back again in the field of general surgery from whence it sprang. Easy or not, however, Dr. Wright has shown us that there is, in a kind of no man's land, a type of surgical treatment which he speaks of as manipulative surgery. As so often happens when no one in particular lays claim to what demands some degree of special ability or experience, this type of treatment is not given full credit. This is particularly so in the case of manipulation of the spine and a heavy structure such as the sacro-iliac joint. But, as Dr. Wright points out, the spinal column is subject to the same type of disease and strain as any other series of joints in the body, and, to some extent at any rate, should be amenable to methods of treatment similar to those used for the smaller joints.

Dr. Wright's contention is supported by cases from his own experience. We would direct attention to his paper as dealing with a type of case which is often obscure and just as often obstinate and troublesome. It is the type of case that is apt to drift away from the medical man because he has not in his armamentarium the manipulative methods which Dr. Wright employs with such success. H.E.M.

An Osler Day in Hamilton

Dr. J. Heurner Mullin, of Hamilton, has called our attention to the fact that at the Annual Clinical Day of 1925 the program was supplied by a Mayo Clinic group, and Dr. Leonard Rowntree in the course of his address at the evening dinner made the following remarks:

> "To our profession, Osler has given much, improved our system of training, enlarged our opportunities for acquiring clinical experience, broadened our outlook on medicine and contributed to our idealism . . . His absorbing passion was the development of the young men. Is it within our power to continue this work? Shall we receive from Osler's hands the torch he carried so successfully for half a century, and create in his name a memorial fund for the continuation of his work, to make possible greater opportunities for young physicians of unusual promise? Is it fitting that such a fund should be started in Canada? I leave this idea with you, hoping that here in Wentworth County, so long the home of the Osler family, and in Hamilton, where Osler first began the practice of medicine, this little seed may find fertile soil in which to grow and bring forth fruit."

This suggestion has taken root, and under the caption of "Ontario News" in this issue of the *Journal* our readers will find an interesting confirmation of this statement. An "Osler Day" has been inaugurated under the auspices of the Hamilton Academy of Medicine which promises well. Already our Association commemorates the work of Osler by an Oration which is delivered once in three years, but the original hope was that, in addition to this, scholarships might be founded for the advancement of medical research. For financial reasons this hope has not as yet fully materialized. Perhaps this new departure of the Hamilton Academy of Medicine may provide the stimulus for an advance movement. The Memorial Fund should be amplified. We trust that this may be so. In the meantime, the Osler Day at Hamilton should prove a drawing card, not only for the members living in the Niagara peninsula but also for those living much farther afield. Try and attend.

A.G.N.

The Annual Meeting at Atlantic City

Since our last reference to this event plans for the forthcoming meeting of our Association with the American Medical Association in June next have been somewhat advanced. A conference with the American Council on Scientific Assembly has been held, at which Drs. J. C. Meakins, George S. Young, Alexander Primrose and T. C. Routley represented the Canadians. We will have an adequate representation on the program of all the scientific sessions, and our officers will preside alternately with the Americans. At the opening general meeting Dr. James S. McLester, for the American Medical Association, and Dr. Jonathan C. Meakins, for the Canadian Medical Association, will deliver their presidential addresses. Special sections, we understand, are being arranged on Military Medicine, History of Medicine, and Anæsthesia, sections which are not ordinarily found in the American Medical Association.

Those who plan to present papers are urged to get in touch with the secretaries of their respective sections, a list of whom will be found on page 673 of the December *Journal*.

It is expected, on account of the universal character of the Convention, that many more than the usual number of guests will attend from abroad, and many special lecturers have been invited to attend.

Begin to plan *now* for your attendance at this great Convention, which will be a unique event in our history. A.G.N.

Special Articles

EDUCATION AND RESEARCH IN THE FIELD OF INHERITANCE OF DISEASE

BY MADGE THURLOW MACKLIN, A.B., M.D.,

Medical School, University of Western Ontario,

London, Ont.

For some time past I have been urging the medical profession, both by spoken and written addresses, to awaken to the importance of instructing medical students in medical genetics, the science which studies the laws governing the transmission of hereditary traits from parents to offspring. The fundamentals of genetics, as evolved through study of plants and animals, where experimental mating is possible, were to be taught in the premedical studies by the biologist; the application of these laws was to be taught to the medical student in the final year of his medical course by a person trained in medicine and competent to discuss the various phases of genetics as applied to medicine. Such a course I termed "Medical Genetics". It might equally well have been called "Pathological Heredity" or "Constitutional Medicine".

Although some of the profession have been interested in this course, others have considered it wholly unnecessary, for several reasons. One was that it was not important; the second was that a student could pick up through his reading all that he needed to know of this subject. It was, so these objectors said, a course only designed for the specialist in the study of human inheritance. Even among those who were interested there were many who felt that a special course was not essential; all that the student needed were the occasional references to inheritance given by the individual clinicians as occasion arose in their clinics. The chief objection from all was that the medical curriculum was already over-crowded, and there was no time for the introduction of a new course. I have pointed out repeatedly that the crux of the matter is not: Is there time? It is: Is it important? If so, time will have to be found.

It is therefore with profound satisfaction that I note in the *British Medical Journal* of December 9, 1933, a paper by such a distinguished member of the English profession as Lord Horder, urging the adoption of such a course in the medical curriculum. I quote from him "The facts already known in relation to genetics should be taught as part of the medical student's curriculum. It is quite true that the medical curriculum is already over-full. But if something which is relatively less important were taken out—*and there is a great deal that is relatively unimportant when compared with the study of heredity* (italics mine), room might be easily provided. In the curriculum as it now stands the only fragment of genetics that the student comes across is a little embryology. Here and there, later in his clinical work, are scattered items of a detached sort, such as the fact that certain rather rare diseases, like colour blindness and bleeding, have familial and sex qualities in their transmission. But of the general principles involved in genetics, and how to apply these to particular cases, the student learns nothing. I doubt very much if many doctors emerge duly qualified from their six years of study to state precisely what it was that Mendel discovered in connection with heredity.

"This being so, enormous opportunities for adding to our knowledge of genetics are lost by the lack of training, and therefore the lack of interest, and by ignorance of how to collect valuable facts, among practitioners. The family histories of patients are of such a meagre kind that they are almost useless to the expert when he comes to study diseases in which inheritance plays an important part. Even the notes taken about patients in their stay in hospitals, where facilities in this direction are so much greater, are extremely scanty where heredity is concerned."

Here I might digress a little to elaborate upon the necessity for good hospital records. How often does the intern put down the words, "Family history negative"! Such a thing is impossible; there can be no family history which is negative. Such a statement means that the intern was either too uninformed or too lazy to get at the facts. It is quite true that there may be no history of the same condition having existed in other members of the family, but the history cannot be negative. The patient had to have parents, and they are either alive or dead. In the first case they are either well or not well, and have attained a certain age; in the second case they died of some specific cause at a definite age. These facts are of great importance, but the intern, never having been trained, fails to appreciate their significance. For example, consider cancer. I feel it safe to say that the majority of physicians do not believe in the hereditary basis of cancer. Certainly the American College of Surgeons gave as its official opinion in its booth at the Century of Progress in Chicago that "Heredity is of no known importance in cancer in man". Where does the physician get his data for not

believing in inheritance of cancer? From data collected in his own and in hospital records. How reliable are such records? Take an example. A man of 64 comes in to the hospital and a diagnosis of gastric carcinoma is made. On the chart is written, "Family history negative", which means that no other member of this man's family had stomach cancer, or perhaps cancer of any other organ. This record is then used as one more case to prove the contention that cancer is not hereditary. But suppose that we had an intern trained in genetics. He would remember that the age at which one member of a family develops an inherited disease is around the age at which other members of the family who may develop the disease show their symptoms also. Thus this intern will inquire at what age his parents died (this is by no means always stated, even when it is obvious that the patient's parents are dead), and he will perhaps find that the mother died at 48 of pneumonia, and the father at 42 in an accident. He will find that this man is the first child in the family, and his other brothers and sisters are considerably younger than he is. With these facts, such a history no longer is one which disproves the heredity of cancer; it merely is discarded as not having enough data on which to base any conclusions.

Another point upon which the trained intern or physician, that is, trained in genetics, will insist, is to be very careful to state in his records whether the twins he is reporting are fraternal or identical. He will examine carefully the membranes of every pair of like-sexed twins to insure accuracy of statement as to their condition. I remember one student asking me if it were possible for twins of unlike sex to have a single chorion, because he had seen such a case after I had stated that it was impossible. After a careful investigation, it was found of course, that there were two chorions, intimately fused at their points of junction. A record of twins with a single chorion with one twin normal, the other malformed, and both of approximately the same size is one that the intern trained in genetics will scan with suspicion, and subject to rigorous scrutiny before he accepts it. One not so trained will see in such a record nothing unusual, and will pass it by until too late to verify its accuracy.

But this training of the medical student in the science of pathological inheritance fulfils but one part of the program which must be initiated before the medical profession assumes its full duty in the matter of inheritance of human ills. A year and a half ago, at the Third International Congress of Eugenics, held in New York, I made a plea for the establishment of an institute for the study of human inheritance, where not only would pedigrees be collected, but where research by medically trained men and women would be carried on among the well members of the families, in the search for the early signs and symptoms of the disease. This institute was to be one of preventive medicine in the realm of constitutional diseases, just as our present institutes of public health are for preventive medicine in the realm of infectious conditions. Hereditary disease is transmissible by germ plasm, if not by germs, and hence comes within the scope of public health activities.

Lord Horder brings out these points, and again it is gratifying to find one's opinions backed by such high authority. He says, "I have already pointed out that eugenics is really a branch of preventive medicine (he might equally well have said "genetics" in place of "eugenics" in this connection) and a branch that is fraught with a deeper and more lasting effect than any other. Just as the public health service requires a special training and a special experience amongst its officers, so genetics, to be properly followed and to be made a scientific basis for practical measures for human betterment, demands a number of doctors who shall give up their whole time to this purpose. In other words, for the thorough pursuit of this study there should be attached to the Ministry of Health a small group of medical men and women to whom the vital statistics connected with life and death and disease should be readily available on the one hand, and contact with hospitals and general practitioners, so as to be in touch with clinical material, should be possible on the other."

I have been interviewing various prominent persons in the attempt to interest them in the establishment of just such a group as Lord Horder outlined; a group whose duty it would be to vitalize the vital statistics, to urge that the data were so collected that not only would they serve as valuable medical material as at present but as valuable research material for the student of heredity in disease. Holland has just established such a service. Russia has an excellent institute in operation where, among other things, they have nearly 600 pairs of twins under observation; Germany has long had such an institute in Berlin, others in other cities; Sweden has one for the study of inheritance in neurological disorders, so I have been told. Why should Canada lag behind? To say that we are in a time of depression and cannot afford it is mere sophistry. We should learn to put first things first as well as other countries. As Lord Horder said with respect to the medical curriculum, if less important things were dropped we could easily find the time and the money for this most important public health service. For example, every one agrees that we are tremendously over-governed. We could do away with a large percentage of our provincial and Dominion parliamentary mem-

bers with nothing but gain for the provinces and the country at large. A scientist would work for a whole year for what our law-makers are paid for a scant eight weeks' work. We spend millions upon amelioration of conditions when we spend not a cent to determine their cause. Such an institute as Lord Horder mentioned would not be a drain upon the country's purse, and it would return many-fold its expense in value to the nation. At the present, here and there, a few persons interested in this subject are working. When they stop all their records, all their material, is lost. In an institute the records would be carried on by new workers as old ones dropped out, and priceless information would be saved for the benefit of our nation. Here follow-up work could be done with families which the busy physician cannot do. Incipient cases of disease would be frequently detected and sent back to the physician to care for. Some of the underlying causes of disease would be discovered, for many potential cases would be watched long before the disease became evident, and the earliest detectable signs would be determined. Such an institute would keep all the records for cancer patients in the province; they would be uniform; instances of the same type of cancer in members of a family would then be on record. At present, one doctor treats a mother for cancer of the breast; twenty-five years later, another doctor treats her daughter for the same condition. The only place the record is filled, in most instances, is in the doctor's memory. But if all cancer histories had to be reported to a central institute, such an overwhelming amount of evidence in favour of inheritance in cancer would accumulate that it could no longer be denied. Once this idea is accepted, then we can begin to work on the underlying factors which make one family develop stomach, another rectal cancer. Even if we make no progress on the side of the prevention of cancer, we can make tremendous strides in the field of early diagnosis, once we appreciate that the same type of cancer is apt to occur in other members of the family.

The universities of Canada should place in the curriculum of their medical schools a course in pathological inheritance, in which medical students would be trained in this basic branch of medicine. The government of the provinces and of the Dominion should establish a service in Human Genetics which would be the centre of research in this fundamental branch of science. We study our crops; we keep records of the weather; we have pedigrees of our stock. Of the constitution of the most important part of our country, namely, the children who are to be the Canada of tomorrow, we know little, keep fewer records, learn nothing new.

Medical Economics

THE DIFFICULTIES OF THE PROFESSION

BY HARRIS MCPHEDRAN, M.B.(TOR.), F.R.C.P.(C.),

Toronto

During the days of economic depression there is another complaint that is frequently heard among members of the profession. This has to do with the numbers that are graduating in medicine—more than we can hope to use in Canada under the system of practice that now obtains. In 1930 an actuarial report was prepared by Prof. M. A. MacKenzie, of the University of Toronto. His conclusion then was as follows: "If all the Universities in Canada turn out 300 men a year among them we shall have enough for our own Dominion requirements and to spare." As this figure was reached after allowing for a 3 per cent increase in population per annum, it can still be considered approximately correct at the present time. The total numer of doctors in the Dominion in 1931 was 10,052, an increase of 931 in 6 years. Ontario alone had 4,028, *i.e.*, 40 per cent of this number, an increase of 189 in 6 years, or 32 per annum—one doctor to each 810 inhabitants. During the period 1925–1931, the number of graduates from Ontario Universities, Queen's, London, and Toronto, was 1,220, *i.e.*, at the rate of 203 per annum—nearly enough to supply the whole Dominion. This number would be sufficient to meet in Ontario the estimated number of 120 for replacements of those lost to the profession on account of retirement, death, etc., and to allow 30 to offset any increase in population. After deducting this 150 from the total supply of 203 per annum a surplus of 53 graduates remains who have to go elsewhere. That an exodus was occurring is shown by the fact that approximately 35 per cent of the University of Toronto graduates in medicine from 1921 to 1926 were located in the United States in 1931, five years after they had graduated. Briefly, then, for the Dominion we need 300 graduates a year and 582 graduated in 1932 from the various universities in the Dominion of Canada. Therefore, in that year an excess of 282 graduated above the number required. For the Province of Ontario we need 150 graduates in medicine per year, and yet we go on grinding them out at the rate, in Ontario alone, of 203 per annum.

The following information in regard to registration in the Faculty of Medicine of the University of Toronto, the numbers graduating in Ontario, and the average age of graduation over the

period noted is furnished through the kindness of Dr. Stanley Ryerson, Assistant Dean of the Faculty of Medicine, University of Toronto. It speaks for itself.

NUMBER OF GRADUATES FROM ONTARIO UNIVERSITIES

Year	*London*	*Queen's*	*Toronto*	*Total*
1930.....	30	49	110	189
1931.....	35	41	136	212
1932.....	37	48	135	220
1933.....	37	45	127	209
1934.....	25	34	104	163

REGISTRATION IN THE FACULTY OF MEDICINE, UNIVERSITY OF TORONTO

Session	*Total Number In Six Years*	*Session*	*Total Number In Six Years*
1923–1924...	867	1929–1930...	734
1924–1925...	774	1930–1931...	792
1925–1926...	777	1931–1932...	817
1926–1927...	738	1932–1933...	824
1927–1928...	731	1933–1934...	794
1928–1929...	717	1934–1935...	827

Year	*Average Age of Graduation*
1914.....	25 (five years' course)
1931.....	25.8 (six years' course)
1934.....	25.6 (six years' course)

Under the present system of practice we are obviously graduating too many young men, but one naturally asks, would there be too many if we were practising according to the ideal set forth in the report of the Committee on Economics of the Canadian Medical Association.?*

This ideal is contained in the following paragraph from this committee's report.

"The ultimate purpose of any plan for improvement (in practice) is to make available for every Canadian the full benefits of curative and preventive medicine, irrespective of individual ability to pay, and at the same time to assure practitioners of medicine and others associated in the provision of medical care a reasonable remuneration for their services."

Having set forth the ideal the Committee goes on and answers very admirably the question that is asked in the paragraph above in regard to number required for practice under an ideal system. It says:

"It should not be assumed that there are too many practitioners. When the economic barrier is removed through the Plan (Health Insurance) and when general practitioners engage in the practice of preventive medicine under the Plan, the numbers required will be found to be much greater than has been considered adequate in the past."

That is to say, when we as practitioners take on the work of preventing disease or detecting it in its incipient phase through a periodic health examination of every one in this province (and this is the goal we should aim at, practitioners and layman alike) we shall require more practitioners than we have at present.

At present we are far from the ideal set out above. The Province of Ontario has made provision for the medical care of the unemployed on relief if the municipality cares to take advantage of it. Through its scheme the doctors agree to accept half their fee for office and house calls, and can collect from the municipality up to a maximum of $100.00 per month, of which sum the Province pays two-thirds and the municipality one-third. The city of Toronto is giving this plan a trial, and I am told it is working satisfactorily, but most municipalities in Ontario refuse to act and assume their share of the burden, with the result that, in these hard times, most of the practitioners of the province are doing a much increased amount of charity work, and *per contra* a lessened amount of remunerative practice.

Of course no provision is made for the indigent or for those of modest income in the Unemployment Relief Act, and the time has come when we as a profession should press for a scheme whereby the ideal set forth above may be attained. What steps should we take to meet the immediate situation as to the numbers of those graduating, the care of the unemployed on relief and the indigent? What steps should we take to meet our future needs looking towards the attainment of the ideal set forth by the Committee on Economics?

Can. Med. Ass. J., 1934, **31**: Supp. p. 25.

If thy Vessel be but small in the Ocean of this World, if Meanness of Possessions be thy allotment upon Earth, forget not those Virtues which the great Disposer of all bids thee to entertain from thy Quality and Condition, that is, Submission, Humility, Content of Mind, and Industry. Content may dwell in all Stations. To be low, but above contempt, may be high enough to be Happy. But many of low Degree may be higher than computed, and some Cubits above the common Commensuration; for in all States Virtue gives Qualifications and Allowances, which make out defects. Rough diamonds are sometimes mistaken for Pebbles, and Meanness may be Rich in Accomplishments, which Riches in vain desire.—Sir Thomas Browne.

Men and Books

THE FIRST RECORD OF AN ANÆSTHETIC IN ONTARIO

BY W. KIRK COLBECK,

Welland

As a matter of record, ether was first used as an anæsthetic for an operation on October 16, 1846, by Doctor Morton at Massachusetts General Hospital, Boston, Dr. Warren operating. Dr. Oliver Wendell Holmes suggested the terms "anæsthesia" and "anæsthetic" on November 21, 1846. Ether was first used in London for a tooth extraction on December 19, 1846. Robert Liston, surgeon, of Edinburgh, amputated a thigh under ether on December 21, 1846. On January 19, 1847, Sir James Y. Simpson, introduced its use in obstetrics.

On November 4, 1847, Simpson discovered the anæsthetic effects of chloroform, and within a week he had used it on more than three hundred people. Before the fifteenth of November it had been used for thirty operations in the Royal Infirmary of Edinburgh.

The first record of ether anæsthesia in Canada is in a paper published in June, 1847, in the *British American Journal of Medical and Physical Science*. It was employed by Dr. Horace Nelson, of Montreal, on May 14, 1847, when his father, Wolfred Nelson, removed a tumour. Dr. Nelson was anticipated, however, by Dr. E. D. Worthington, who amputated a leg, under ether, at Sherbrooke, Que., on March 11, 1847.

Dr. Andrew F. Holmes, of Montreal, used chloroform in a midwifery case on January 25, 1848. We quote from Maude Abbott's History of Medicine in the Province of Quebec, 1931, p. 73, which reads as follows.

"This made a profound impression and is reported by him as the first example of its employment in this province (*Brit. Am. Journ.*, 1847-48, **3**: 263). On February 10th following, E. D. Worthington reports its employment by him in three cases at Sherbrooke, and about the same time J. E. Martin used it at the Marine Hospital, Que., during an amputation of the great toe."

What about Canada West—Upper Canada—or, as we know it today, Ontario. So far as I have been able to find, there is no known record of the first use of either ether or chloroform in the province in any medical publication. No medical journal was being published in Ontario at that time. We have, however, come across in "The History of Niagara", 1914, by Janet Carnochan, mention of the fact that Dr. Duncan Campbell, of Port Robinson, used chloroform as an anæsthetic on May 31, 1848. She quoted from the *Niagara Mail*, June 7, 1848. This paper was owned by Alexander Davidson, and the editor was Wm. Kirby, the famous publicist and author of "The Golden Dog". In 1851, Kirby became owner as well as editor, and, from the wording and style of the article, we are justified in assuming that he wrote the article. Through the kindness of his grandson, the present Wm. Kirby, of Niagara, we have been able to locate a copy of the *Mail*, volume 3, No. 10, in the files to be found in the Historical Building of that town. We will give the article in full.

"On the 31st ultimo, Dr. Campbell, Port Robinson, performed a very serious operation on Mrs. Andrew of this town, without the slightest pain; through the influence of chloroform, a cancerous tumour was removed. The excision of the female breast is, we understand, an operation of the most painful nature, yet during its continuance and for upwards of half an hour after it was concluded the lady remained in a calm and tranquil slumber, and upon awakening was quite unconscious that the operation had been performed. The first dressing of the wound, several hours after the operation, which we understand is nearly as painful as the operation itself, was done under the influence of a second inhalation of 'chloroform' and was completed without the least sensation. Indeed, upon returning to consciousness, she would scarcely believe that any thing had been done. It certainly is marvelous that in the short space of four or five days so serious an operation should be attended with a result so satisfactory.

The wound occasioned by the excision was five or six inches in length. Mr. Andrew says the chloroform was held over the mouth in a sponge for 55 seconds — the period of the operation, and for about a minute afterwards. The quantity used was about half an ounce but it seems that about one-half would have accomplished the object. In the subsequent inhalation the effect was produced by about half a dram.

By telegraph from Chippawa, June 5, 1848.

To John Andrew—

Wound entirely healed, feels pretty well, ready to travel to-morrow.

D. Campbell."

(From the *Niagara Mail*, Wednesday, June 7, 1848.)

So here we have a record written by a brilliant newspaper man, a very simple, intelligible account, reasonable, an account which might have been written by one of Dr. Campbell's confrères in the Niagara district.

We might speculate as to who actually gave the anæsthetic, but of this there is no record. We do know, from a copy of the *Niagara Mail*, of November 22, 1848, and I have verified this from the lips of Mrs. Servos, who still lives in Niagara, aged 91, and who is the only surviving member of the family of Dr. Lowe, of Niagara, that he used chloroform as an anæsthetic for his patients on whom he operated for strabismus or squint. We quote from this paper of November 22, 1848, as recorded in the "History of Niagara", by Janet Carnochan.

"We understand that Dr. Lowe, of this town, M.R.C.S.L., L.A.C.L., recently performed several successful operations where obliquite of the eye was concerned. One of the individuals was formerly a workman in our office. We believe the doctor uses chloroform in cases susceptible to its influence. Niagara is favoured with a fair or rather an unusual proportion of medical talent and skill. Dr. Lowe, Dr. Melville and Dr. Maitland, of the Royal Canadian Rifles, are all above mediocrity in their profession. A few days ago Dr. Maitland amputated the leg of a soldier, who refused to avail himself of the aid of chloroform, saying he would rather be shot as use it."

Now who was Dr. Duncan Campbell and how did he come to obtain a supply of chloroform so soon after it was discovered by Simpson in Edinburgh, on November 4, 1847? It took fourteen weeks for a vessel to come from Glasgow. We will quote from Canniff.

"He was born in Argyleshire, Scotland, in 1811. His early education was obtained in Caen, France, and later he graduated from the University of Edinburgh, 1833. He came to Canada in 1834 and became Licentiate of Upper Canada, June 4, 1934. He was surgeon in one of the battalions in the rebellion of 1837 and at the close of the rebellion settled in Hamilton, but soon after removed to Port Robinson, later to Niagara, where he remained until 1858, when he moved to York, now Toronto. His medical titles were the following: L.R.C.S. Edin.; M.D., University of Edinburgh. He was President of the Homœopathic Board of Ontario Medical Council from the latter date up to the time of his death, having occupied the position of Vice-President, and, at the time of his death, President of the Council.

"He was a man of good education, great intellectual power, and his services in the Medical Council in the cause of higher education were exceedingly valuable. He joined heartily in the amalgamation of the different licensing boards into the one sole licensing body in Ontario, the wisdom of which has already borne such good results to the public and the medical profession in Canada. Although somewhat imperious and arbitrary in his manner at times, he was, nevertheless, possessed of an agreeable and genial nature, and, though liable sometimes to give offence, he was always ready to forgive and forget. He leaves a widow and eleven children, six daughters, two of whom are unmarried, and five sons, to mourn his loss."

His brother was a professor in the University of Edinburgh and it is altogether likely that it was he who forwarded a supply of chloroform to his brother in Port Robinson during the winter of 47 and 48.

At his request, his body was brought to Niagara and buried as close to the walls of old St. Andrew's Church as was possible. His resting place is marked by a granite monument on the west side of that historic building.

I would express my indebtedness to Dr. Jabez Elliott and to Dr. A. G. Nicholls for their assistance in the preparation of this article.

Association Notes

MEETING OF THE EXECUTIVE COMMITTEE

October 30, 1934

The Executive Committee of the Canadian Medical Association met in the Chateau Laurier Hotel, Ottawa, on October 30, 1934, at 9.30 a.m. The following members of the Committee were present:— Drs. Geo. S. Young, Toronto (*Chairman*); J. S. McEachern, Calgary; J. C. Meakins, Montreal; J. G. FitzGerald, Toronto; C. J. Veniot, Bathurst, N.B.; A. G. Nicholls, Montreal; W. Harvey Smith, Winnipeg; Léon Gérin-Lajoie, Montreal; A. T. Bazin, Montreal; K. A. MacKenzie, Halifax; F. S. Patch, Montreal; J. E. Bloomer, Moose Jaw; A. Primrose, Toronto; Duncan Graham, Toronto; A. Grant Fleming, Montreal; and T. C. Routley, Toronto.

The proceedings are here given in abstract. Attention was called to the date set for the joint meeting of the Canadian Medical Association and the American Medical Association in Atlantic City—June 10th to 14th, 1935. Haddon Hall was approved as the hotel headquarters for the Canadians.

Dr. Young, being Chairman of Council, Chairman of the Central Program Committee, and Chairman of the Committee on the Revision of the By-Laws, asked that he be relieved of his duty on the Program Committee. This was agreed to and Dr. Primrose was appointed Chairman of this Committee.

Drs. J. C. Meakins, President-elect, George Young, Chairman of Council, the General Secretary, and Alexander Primrose were appointed to proceed to Chicago to confer with the officials of the American Medical Association on November 10th on the matter of arrangements. They were invested with plenary powers.

A SPECIAL AWARD IN MEMORY OF THE LATE DR. F. N. G. STARR

DR. PRIMROSE, Chairman of the special committee appointed to deal with this subject, reported:

That a committee composed of DR. PRIMROSE, with power to add was formed at the meeting of the Executive Committee at Calgary, June 21, 1934. The Chairman had added the names of members of the Sub-Executive in Toronto as members of this Committee. The matter had been discussed by the members of the Sub-Executive Committee at a recent date. At this meeting, DR. PRIMROSE stated that, in his opinion, it was extremely difficult to raise an adequate sum of money by appealing to private individuals in the community. The suggestion was made that a circular letter be addressed to every member of the Canadian Medical Association through the secretary's office, asking donations. It was felt that DR. STARR'S long service, as a member of the Executive Committee and as President of the Association, would

ensure a ready response. It was also suggested that after subscriptions had been obtained from this source, private individuals should be approached to supplement the amount raised as donations from members of the Association.

The Committee determined to lay these suggestions before the Executive Committee for discussion and to determine the policy to be pursued. As MRS. STARR has expressed a desire to be informed of the proposed activities of the Committee, it was agreed that her wishes should be met in that regard. Her advice would be valuable particularly in suggesting the names of private individuals who would welcome the opportunity to subscribe to the fund.

A. PRIMROSE, *Chairman.*
Approved.

DR. BAZIN.—Before making any attempt to raise funds, should we not decide what form the memorial will take?

Dr. Bazin also referred to the Osler Memorial Scholarships (medical) which are now given by the Association, the funds having been made available by two contributions of $6,000 each, and he made the suggestion that the F. N. G. Starr Award be in the form of a scholarship offered to young men for advancement in surgery.

DR. PRIMROSE.—I think this would be an excellent idea. May I ask if there is any elasticity with regard to the Osler Scholarships, or are they tied down to a definite procedure?

DR. BAZIN.—They are limited to two candidates, one nominated by the Medical Faculty of McGill University, and the other by the Board of Trustees of the Montreal General Hospital. The scholarships are awarded every three years, and the funds are provided by the interest which has accumulated in that time on each of the $6,000 units. It might be possible to collect one or two units of $6,000 each in Toronto to establish this proposed scholarship in memory of the late Dr. F. N. G. Starr. As the present scholarships are raised in Montreal and restricted to McGill University, I would suggest the establishment of a similar scholarship in Toronto, restricted to the University of Toronto, in memory of the late Dr. F. N. G. Starr.

The opinion was expressed by other members of the Committee that it would not be advisable to establish another Oration, but that some form of scholarship would be preferable.

LEGISLATION AFFECTING CHIROPRACTORS IN B.C.

Attention was called to the Act respecting chiropractors in the Province of British Columbia, which was passed by the Provincial Legislature last spring. This Act states specifically:

(1) That no person registered as a chiropractor under this Act shall engage in the practice of the diagnosis or treatment of the human body for disease, or the causes of disease, otherwise than as a chiropractor. (2) That a person registered as a chiropractor under this Act may in connection with his practice use x-ray shadow photographs of the human spinal column and, if he first applies and obtains from the Board of Chiropractors a certificate of competency therefor, he may, in connection with his practice, use x-rays for the purpose only of producing photographs of the human spinal column. (3) Nothing in this Act or Regulation shall authorize any person to prescribe or administer drugs for use internally or externally, or to use or direct or prescribe the use of anæsthetics for any purpose whatsoever, or to practise medicine, surgery, or midwifery, or to use any method other than chiropractic in the treatment of disease.

This information has been forwarded to each provincial association.

THE EDMONTON ACADEMY OF MEDICINE *re* HEALTH INSURANCE

The following resolution was brought to the attention of the Executive Committee from the Edmonton Academy of Medicine:

WHEREAS the Government of the Province of Alberta is actively interested in the manner in which the practice of medicine shall operate.

BE IT RESOLVED that the Edmonton Academy of Medicine recommend as follows: (1) That the organizations of the profession, namely, the College of Physicians and Surgeons of Alberta and the Alberta Medical Association, cooperate in this project. (2) That our representative organizations, namely, the College of Physicians and Surgeons of Alberta and the Alberta Medical Association, confer with the members of the Government in the making of all contemplated appointments, and in the establishing of a basis for the proper remuneration in accord with the services rendered. (3) That the Canadian Medical Association be asked to take active steps to secure similar action by the medical organizations of the other provinces. (4) That a copy of this resolution be sent to the Secretary of each of the following organizations: The College of Physicians and Surgeons of Alberta; the Alberta Medical Association; all other medical associations within the Province of Alberta; and the Canadian Medical Association.

The opinion was expressed that the approval of this resolution would commit the Canadian Medical Association to taking active steps in bringing about health insurance in the different provinces of Canada. The Canadian Medical Association has no such mandate. The resolution was tabled.

REPORT OF THE COMMITTEE ON ECONOMICS

It was reported that the Report of the Committee on Economics had been reprinted in booklet form for distribution, copies having been sent to all the provincial medical associations for their consideration, according to the resolution passed at the Calgary meeting. Requests for copies of the Report have been received from many organizations and persons in both Canada and the United States.

The GENERAL SECRETARY reported that the provincial medical associations in Manitoba, Saskatchewan, and British Columbia, had recommended that copies should be sent to every member of the profession in those provinces.

The opinion was expressed that the compilation of this report is one of the most important pieces of work the Canadian Medical Association has done, and that it should be as widely dis-

tributed by the Canadian Medical Association as the funds of the Association will permit. The question was raised as to whether it would be possible to have the report translated into the French language for distribution among the French-speaking doctors of the Province of Quebec. DR. GÉRIN-LAJOIE expressed the opinion that the Editor of *L'Union Médicale* would print the Report in sections, possibly covering it all in two or three issues, and that reprints of the complete report in the French language could then be secured from *L'Union Médicale*. This plan met with the unanimous approval of the members of the Executive Committee, who felt that, if at all possible, the Report should be made available to the French-speaking doctors of Quebec. It was agreed that the Canadian Medical Association would be responsible for the cost of the reprints, whatever that might be.

It was finally decided that copies of the Report of the Committee on Economics be supplied to every doctor in Canada.

The question was asked as to how widely the Report should be distributed outside of Canada. It was the opinion of the members of the Committee that copies of the Report should be sent where requested outside of Canada at a cost to be decided on by the Honorary Treasurer and the General Secretary.

It was finally moved by DR. PATCH, seconded by DR. VENIOT:

That the General Secretary be empowered to have printed an additional number of copies for distribution outside of Canada. *Carried.*

B.M.A. MEETING—MELBOURNE, 1935

It was reported that the British Medical Association will meet in Melbourne in September, 1935. They have invited the Canadian Medical Association to appoint two or three official delegates to this meeting, and have also requested that our *Journal* publish particulars of the meeting from time to time. DR. NICHOLLS reported that this latter point had already received attention.

The opinion was expressed that the members of the Association should be kept advised from time to time through the *Journal* with regard to plans for the tour to Melbourne, such publicity to be left in the hands of the sub-Executive Committee.

MATERNAL WELFARE

At the meeting of the Executive Committee held in Calgary, a memorandum was presented from the Maternal Welfare Committee, requesting that certain material dealing with maternal welfare be published in an early issue of the *Journal* and reprints secured for distribution. The matter was, at that time, left in the hands of the Editorial Board and the question of reprints was to be referred back to this Executive Committee with an estimate of the cost.

DR. NICHOLLS stated that arrangements had been made to publish the material in question in the November issue, together with an editorial calling attention to these articles and the need for reporting all cases of puerperal septicæmia. The complete material would take about eight pages of *Journal* size. The cost for reprints would be $20.00 per 1,000 copies.

The question was asked as to about how many reprints would be required and the reply was, that to send them in the manner suggested by the Committee on Maternal Welfare would require between 12,000 and 15,000 copies. The Honorary Treasurer expressed the opinion that the Association could not afford this expense at the present time.

It was moved by DR. FITZGERALD, seconded by DR. PATCH:

That the action of the Editor be approved and that the question of reprints be referred to the Associate Secretary in charge of the Department of Publicity and Health Education, and the Chairman of the Committee on Maternal Welfare, to report back to this Executive Committee; and that, in the meantime, arrangements be made with the publishers of the *Journal* to have the type held. *Carried.*

HEALTH ACTIVITIES—DEPARTMENT OF PENSIONS AND NATIONAL HEALTH

At the Calgary meeting considerable time was spent in discussing the action of the Department of Pensions and National Health in transferring the work formerly carried on by the Division on Child Hygiene to the Canadian Council on Child and Family Welfare. The Council of the Canadian Medical Association, at that meeting, passed a resolution recording its opposition to this act on the part of the Dominion Government, and the General Secretary was instructed to send a copy of the resolution to the provincial medical associations for their opinion. The General Secretary now read a number of comments received from the provincial associations in reply to this letter, in all of which approval was expressed with regard to the action taken by the Canadian Medical Association.

It was moved by DR. PRIMROSE, seconded by DR. BLOOMER:

That this Executive Committee take no action in connection with this matter at the present time.
Carried.

REVISION OF BY-LAWS

At the Calgary meeting, a committee with DR. GEO. S. YOUNG as Chairman, was appointed to revise the By-Laws of the Association. A letter was sent to each of the provincial associations and to each member of Council, along with a copy of the By-Laws as now existing, asking for any suggestions they might wish to make. It was now reported that a number of these had sent in criticisms and suggestions, all of which would be taken up by the Committee in the near future.

Some discussion arose as to whether the Code of Ethics should be included as an Article of

the By-Laws. One member of the Committee Committee expressed the opinion that, instead of the Code of Ethics, we might set forth a number of things that the Association cannot approve of.

DR. BAZIN pointed out that, in the Royal College, a committee drew up the By-Laws and submitted the whole to legal opinion. They decided that they would incorporate the Code of Ethics of the Canadian Medical Association with some revisions. When the copy came back from the solicitor, they found that the Code of Ethics was included as a Chapter of the By-Laws, and the solicitor considered that another Article was necessary, called "Misconduct of Fellows". In this Article, there was set forth the means of dealing with any Fellow guilty of contravention of the Code of Ethics.

The Chairman pointed out that there were two points before the Committee at this time—(1) that this Committee should be empowered to revise the Code of Ethics; (2) that it incorporate the Code of Ethics in some form in the By-Laws. The opinion was expressed that, as the By-Laws now stand, there is no machinery for taking action against a man who is guilty of infraction of the Code of Ethics.

It was agreed that these suggestions should be passed on to the Committee in charge of the revision of the By-Laws and that it would be within the province of the Committee to deal with them in the proposed revision.

ANNUAL MEETINGS IN THE MARITIME PROVINCES

The Secretary reported that, due to illness last July, it was impossible for him to attend the annual meetings of the Maritime Provinces and the Executive Committee asked Dr. A. Grant Fleming to represent the General Secretary at these three meetings. The General Secretary now presented a report from Dr. Fleming with reference to his trip, as follows:

The meeting in Nova Scotia was a real success in every way. The attitude towards the Canadian Medical Association was very friendly. In New Brunswick the attendance was small. The report of the Committee on Economics was not discussed.

In discussing this, DR. VENIOT stated that at the last Provincial Executive Committee Meeting there had been a long discussion with regard to the Report of the Committee on Economics. Strong opposition was expressed with regard to the principle of the Canadian Medical Association talking state medicine. A resolution was passed by the New Brunswick Association to the effect that the Report of the Committee on Economics is so indefinite and incomplete that it is impossible to arrive at any conclusions, and, therefore, they have no suggestions to offer. The opinion was expressed at the New Brunswick meeting that the Canadian Medical Association seems to be endeavouring to foist state medicine on the provinces, and that, in discussing the subject as the Association is doing, they are only putting it before the public and trying to interest them in bringing about some system of state medicine. Dr. Venoit stated that he had tried to point out to them that we should prepare the ground work, so that in the event of any province wanting to have health insurance or state medicine we would be ready to offer something which would be satisfactory, and not have some system thrust upon us. DR. VENIOT expressed the hope that the visit of the President and the General Secretary to New Brunswick would result in enlightening the members of the New Brunswick Medical Association with regard to the activities of the Canadian Medical Association.

The meeting in Prince Edward Island was most successful and pleasant. There was a splendid program and discussion and a good spirit was displayed.

Re FINANCES, CALGARY MEETING

The General Secretary presented a statement of expenses incurred by the Local Committee in Calgary in connection with arrangements for the meeting, showing a deficit of $337.82. Dr. McEachern stated that he was of the opinion that the Local Committee did not wish this deficit to be a charge against the Canadian Medical Association, but that the budget would be balanced locally.

RESOLUTION FROM THE SECTION OF MILITARY MEDICINE

The following resolution was passed by the Section of Military Medicine at the Calgary meeting:

WHEREAS the mobilization in 1914 recruited the medical men as officers in the C.A.M.C. more or less in the order in which they applied, resulting in: 1st—The denuding of the staffs of many hospitals of most of their specialists, such as radiologists, surgeons, oculists, laboratory men, etc. 2nd—The serious impairment of the staffs of some of our medical colleges. 3rd—The almost total abolition of efficient medical and health services in many of our towns, villages, and country districts.

BE IT THEREFORE RESOLVED that the Canadian Defence Council be asked to devise some such plan as the following, which would automatically begin to function as soon as mobilization is ordered in the future: 1st—That the recruiting for officers of the C.A.M.C. in each Military District shall be governed by a Committee of three, consisting of the District Medical Officers, and two medical men of high repute and influence in the District, to be named annually by the Canadian Medical Association. 2nd.—That this Committee shall be held responsible for selecting suitable medical men to fill the requirements of the army, and also to leave suitable and sufficient medical personnel to carry on successfully the civil hospitals, the medical colleges, and the civil, medical, and health work of the District.

Moved by DR. BAZIN, seconded by DR. MCEACHERN:

That we pass this suggestion on to the Government, assuring them that, if requested to do so, this Association will be prepared to name two or three members of each of the eleven committees representing military districts.

Carried.

Hospital Service Department Notes

Consultations on Public Patients

Under our hospital system in Canada all public hospitals care for both public and private patients and the care of the indigent patients in most hospitals falls upon the members of the active staff in varying degree. Obviously consultations are frequently required, and it has been noted that while most hospitals, particularly the larger ones, have a well-observed routine for the care of such patients, many hospitals have not drafted clear-cut regulations respecting the holding of consultations on these patients. This is of vital importance and should be given serious thought, for the acceptance of this trust by a hospital and its medical staff places upon them a distinct moral obligation to give these impecunious patients the best possible care. Moreover, a definite legal onus is assumed as well.

Consultations on free patients are taken just as seriously as on private patients. Actually they are usually much more satisfactory, because of the more complete study, particularly of a radiological or biochemical nature, which is usually possible. Consultation request cards should be available, and should be used routinely, irrespective of any verbal request, to protect the patient from oversight and as a matter of record. In commenting on this subject recently *Modern Hospital* referred to an arrangement in some institutions where two types of consultation request forms are used; a coloured form indicates that a consultation with the chief is desired, while a white form implies that no emergency exists and a routine opinion only is asked. While it may be convenient and at times desirable that junior men respond to requests from other services for consultation, vital decisions should be made by the senior men. A chief or senior should be as concerned over the diagnosis and treatment of consultation patients on other services as he is of those immediately under his care. Moreover, from the viewpoint of a consulting practice, his colleagues appraise him more perhaps by his value in ward consultations than by his ministrations on his own service.

The consultation should be prompt and not delayed for a day or two after the receipt of the card. If possible it should be arranged when the chief in charge is present. Also the opinion should always be written in concise form on the patient's chart. Above all, the opinion should be a studied one, for a snap diagnosis is not fair to the patient and is an unworthy reflection on the consultant. If further study or other opinion would seem desirable the consultant should frankly say so. Follow-up visits should be encouraged.

An essential link in the consultation organization is the nursing service. While interns, if they be available, usually arrange the consultations, a constantly changing service such as the intern service cannot be depended upon entirely, and the supervisors should train their nurses to hand the doctor a request card as soon as he speaks of calling a consultant and to see that these request forms are routed expeditiously through the proper channels. Larger hospitals may have a central depot for the collection and distribution of these requests, but in most hospitals it is found sufficient that the supervisor or charge nurse see that the card is placed in the hands of the supervisor on the consultant's service. Where there is maintained a check-in system for the doctors, a duplicate or call notice is frequently deposited in the doctor's box or space.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

University Notes

Dalhousie University

Dr. William Inglis Morse, well and favourably known in Liverpool, N.S., has donated $500 to Dalhousie University, to establish two prizes for students in history and medicine, respectively. Dr. Morse, donor of the Morse collection of books valued at more than $20,000, is a native of Paradise, Annapolis Co., N.S.

The University of Manitoba

Arrangements have been made by the Committee on post-graduate instruction of the Faculty of Medicine, University of Manitoba, for a twelve weeks' course in "Anatomy as applied to medicine and surgery", to be given by Alexander Gibson, F.R.C.S.(Eng.), Assistant Professor of Surgery and Lecturer in Applied Anatomy. The sessions will be held weekly in the evening, and registration is limited to 30. The course will begin on January 4th.

Following the Bonspiel at Winnipeg in February a three days' course in cardiovascular diseases has been arranged. Lectures and demonstrations will be given by the Chief and members of the Department of Medicine.

Next autumn a refresher course lasting a week will be put on with the cooperation of the Provincial Department of Health. It is proposed to set aside a part of the week for work of special interest and value to medical health officers.

ROSS MITCHELL

McGill University

Satisfaction was expressed with the progress of scientific research being conducted at McGill University with the aid of generous grants from the Rockefeller Foundation during a tour of inspection recently completed by Dr. Max Mason, president of the Foundation. One of the items in which he indicated a keen interest was the detection of small quantities of lead in the blood and spinal fluid. Support for this research, conducted by the Department of Neurology and Physics, was given recently by the Foundation to the extent of $10,000.

The Rockefeller Foundation has been one of the most generous benefactors of the University. Some $3,000,000 has been given by it to McGill since the close of the Great War, when the Foundation widened its support of great university centres.

The first gift was in 1921, when the Foundation gave $1,000,000 as a general endowment of the Faculty of Medicine. This made possible the erection of the Biological and Pathological Buildings, an accomplishment which has resulted in a great stimulation of medical research at the university and which has enabled the university to bring many outstanding research workers here. In 1924 came the endowment, to the extent of $500,000, of the University Medical Clinic; the sum of $57,500 was granted in 1925 for a study of child life; $85,000 in 1929 for research and experimental surgery, to which was later added $15,000 for further progress in this research; $110,000 in 1930 for social science research, and in 1932 came the largest gift of all when $1,232,652 was granted for the development of teaching and research in neurology. This sum, augmented by local benefactors, made possible the erection and endowment of the Montreal Neurological Institute, recently opened.

University of Toronto

One of the world's greatest leaders of medical research, Sir Henry Hallett Dale, on October 4th signed his name in the golden book of the University of Toronto, and was added to the list of eminent graduates.

In introducing him for the degree of Doctor of Laws, *honoris causa*, at the special convocation called in his honour, President H. J. Cody said: "In his position as head of the National Institute for Medical Research in Hampstead, under the Medical Research Council of Great Britain, he has been one of the most potent forces in stimulation and direction of medical research." Doctor Cody referred to Sir Henry's notable work on wound-shock during the war. He spoke also of the links which bound him particularly to the University of Toronto. In 1927 he had been chosen as the University of Toronto's Charles Mickle Fellow. Back in 1922 he had rendered invaluable service by assisting the governors to make suitable arrangements with the Medical Research Council of Great Britain for the administration of the insulin patents in the British Isles. He had taken a leading part in the deliberations for the establishment of an international standard unit of insulin, and for its widest possible distribution, so that it might be readily available in all parts of the world. In fact, he had been in close touch with the University of Toronto ever since the discovery of insulin by Banting and Best.

Chancellor Sir William Mulock conferred the degree and on the platform beside Sir Henry was Hon. Dr. J. A. Faulkner, minister of health for the province. A large number of outstanding men in the medical world attended the convocation and stayed to hear Sir Henry's address to the Physiological Society.

Dr. E. J. King, Assistant Professor of Medical Research in the University of Toronto, has been appointed to the Readership in Pathological Chemistry in the British Post-graduate Medical School at Hammersmith, London.

The readership is equivalent to the post of Associate Professor, and is the blue ribbon honour in that field. Dr. King will work under Dr. E. H. Kettle, pathologist to St. Bartholomew's Hospital, London, who is the head of the pathological department in the post-graduate school.

Dr. King, a graduate of McMaster and Toronto, worked here under Sir Frederick Banting and the late Professor Harding.

Special Correspondence

The Edinburgh Letter

(From our own Correspondent)

A scheme, which is the first of its kind in Scotland, has been organized by the doctors in the County of Lanarkshire to prevent the victims of industrial accidents from running the risk of becoming permanent cripples. It is realized that many of these disabilities might be prevented if at the time of discharge from an infirmary or similar institution the men were given further expert treatment. The large waiting lists at the central hospitals render it impossible for many of them to receive the after-care they really require at that juncture if they are to be restored to full efficiency. No service at present exists to provide such an essential part of their treatment. To remedy this state of affairs a system of orthopædic clinics has been devised. When a patient is discharged from the central hospital he will be seen by his family doctor, who, if further institutional treat-

ment is required, will arrange for his transfer to the nearest orthopædic clinic. Here he will be given graduated exercises, massage, electrical treatment, etc., as his condition requires. Such a service will be of the greatest possible value. In the past many of these men have become permanently unemployable; they have been unable to support their families and have had to be provided for by the State. Apart from the physical deterioration, the supervention of mental disorders such as neurasthenia, hypochondria and melancholia has also to be reckoned with. The movement has the support of the local authorities, the trade union leaders, and the employers of labour, and the result will be watched with great interest.

The Government have decided to proceed with a scheme for providing new Government buildings in Edinburgh. At the present time the various departments are housed in different parts of the city and this results in very considerable inconvenience. The site selected is the Calton Hill. Here was previously located the Calton Jail, which, whatever its inmates may have thought of the interior of the building, was externally of a picturesque character, and was frequently mistaken by visitors to Edinburgh, as they approached the city by train, for the Castle. Edinburgh is very jealous of any suggested alteration of its main features and any such new proposals are meticulously examined. General approval has, however, been given to the plans for the new buildings, including that of the Royal Fine Art Commission for Scotland. The architect has designed a building which is in harmony with the unique setting the site affords. On its southern aspect the building rises sheer from the edge of a cliff and is visible from many distant parts of the city. The design is not only admirable from the practical point of view, but without being a mere imitative reproduction of existing buildings is in harmony with them. It is likely to be a structure which future generations will regard as a worthy example of twentieth century architecture.

The gravity of maternal mortality and morbidity in Scotland was referred to recently by Sir Comyns Berkeley, of the Middlesex Hospital, London, when he formally opened the new radiological department of the Royal Samaritan Hospital for Women in Glasgow. He said it was the everyday experience of the gynæcologist to find that a large percentage of the patients admitted to his wards were suffering from complications directly attributable to child-bearing. The Samaritan Hospital, Sir Comyns went on to say, was the largest and one of the most renowned gynæcological hospitals in the kingdom, and the addition of this newly-equipped department would still further increase its efficiency. Modern ideas envisaged a combined obstetric and gynæcological hospital, as such a combination afforded increased opportunities for research and x-ray work. He had further developments in mind. Under our present hospital system there were large numbers of women who would not go into the general wards, or who were not quite the people who should be admitted to such wards. Such people had to be sent into private nursing homes in which such ancillary services as pathological, biochemical, x-ray departments, and so on, could not be provided. He stressed the importance of the establishment of a private patients' block which should have a majority of controlled beds. By that he meant accommodation for patients in respect of whom, for the payment of a fixed sum, all necessary medical or surgical treatment including nursing and board would be available. Referring to the special use of x-rays in gynæcology, both with regard to diagnosis and treatment, he spoke of the relief that had been given to thousands of persons suffering from cancer by means of treatment by radium and x-rays, and said it was a moot point whether in the long run that method of treatment or the operative method would prove the most successful.

According to the 79th annual report of the Registrar-General for Scotland, the principal vital statistical features of the year 1933 are a birth-rate which is the lowest on record, a marriage-rate which is the highest recorded during the last ten years, a general death-rate below the average of recent years, and an infantile mortality which, with one exception (1923), is the lowest ever experienced in this country.

R. W. CRAIG.

7 Drumsheugh Gardens,
Edinburgh.

The London Letter

(From our own Correspondent)

While an uninformed section of the public clamours for a "cause of cancer", research work into the disease, especially as regards radiological treatment, continues steadily to elucidate important problems. The latest report of the radium centres (collected by the Medical Research Council into a special report No. 197) indicates that for certain regions radium in this country is becoming the treatment of choice. A comparison of the results obtained in uterine cancer by radium locally with x-rays to the pelvis and those obtained by surgery shows clearly that frankly operable cases are treated just as successfully by radium as by surgery but with a much smaller operation mortality. Surgically inoperable cases, moreover, treated by radiation yield a by no means negligible percentage of clinical cures. The mode of action of radium is studied in a large series of papers in the eleventh scientific report of the Imperial Cancer Research Fund just issued. A particular point of interest lies in certain work

showing that the sensitivity of the malignant cell to irradiation is not, as formerly thought, a fixed property of the cell. By a series of *in vitro* experiments, in which the functional condition of the respiratory mechanism of such cells was altered, great differences in the radiosensitivity was observed, increased lethal effects being obtained when the cells were in the oxidized phase. Another curious effect obtained in another series of experiments with experimental tar carcinoma in mice showed that the addition of fresh liver to the diet produced an accelerated and increased carcinogenic response. This is not apparently due to the anti-anæmic factor.

Another subject upon which the pundits of the popular press continue to make loud lamentations is maternal mortality. Nearly 3,000 deaths a year among comparatively young and presumably healthy women naturally arouse criticism from the senior statesmen downwards. The departmental committee of the Ministry of Health claimed that at least half the deaths investigated by them could have been prevented, and an important body of expert opinion, perhaps a minority view, however, claims that excessive operative interference is mainly to blame. Discussions on ante-natal care reveal the fact that this has not yet reached the theoretical standards considered necessary, while yet another aspect of the problem turned a recent meeting of usually decorous women into an indignantly protesting gathering. This was largely due to the suggestion, confirmed by several speakers, that undernutrition was mostly to blame, and it aroused much bitterness that an expert of Lady Barrett's standing could declare that where no other outstanding cause was present the death of a woman in childbirth was invariably associated with a state of extreme malnutrition. While some held that the present maternal mortality rate will not be greatly lowered by any measures the fact of a possible nutritional factor gives grounds for simple administrative action.

Rebuilding seems popular, and now that Middlesex Hospital has reached the end of its great scheme the public is being invited to turn its generosity in other directions. The Hospital for Sick Children, Great Ormond Street, has to face the problem of reconstruction at an estimated cost of £400,000, for which an appeal is just being launched. The old site is to be utilized with the main ward blocks on the north facing south over a reconstructed outpatient department and administrative sections. The Prince of Wales has described this institution as the most famous children's hospital in the Empire, and its call for help should be far reaching in its appeal. The Prince, who is President of Great Ormond Street, has recently shown his interest in another important rebuilding enterprise when he visited Birmingham to lay the foundation stone of the new hospitals' centre on the outskirts of the city. Planned to house eventually 750 patients, with a wing for 100 private patients, with all the necessary services and a new medical school building on an adjoining site, the new venture in Birmingham is an ambitious and promising scheme for which over half the necessary money has already been found.

Tetanus is not, fortunately, a common disorder in this country, but many feel that such cases as do arise might be more satisfactorily treated. A group of workers recently put forward a strong plea for centralization of all cases of the malady in suitably equipped institutions where special treatment by experienced men could be carried out. That special treatment (apart from serum, the dosage and mode of use of which is also a matter of some hazard) could do something to reduce mortality is indicated by experiments on the use of curare to control the "spasms", combined with mechanical artificial respiration or by the use of prolonged anæsthesia, possibly for days, by a team of anæsthetists.

ALAN MONCRIEFF.

121 Harley St.,
London, W.1.

Letters, Notes and Queries

Lymphogranuloma Inguinale and Granuloma Inguinale

To the Editor:

I have read with interest Dr. Kinneard's paper on lymphogranuloma inguinale which appeared in the November, 1934, issue of the *Journal*.

It is perhaps unfortunate that the name lymphogranuloma inguinale is the one generally used to designate the condition; firstly, because the affection is by no means confined to the inguinal glands; and, secondly, because the name leads to confusion with another disease, granuloma inguinale.

Kinneard states, on page 496, that no cases of lymphogranuloma inguinale have been reported in Canada. An editorial footnote has been inserted on the same page, noting that four cases of granuloma inguinale were reported from Montreal in 1930. This is, of course, misleading as the granuloma inguinale reported from Montreal is a totally different disease from that described in Dr. Kinneard's paper. Granuloma inguinale is a disease of the skin and does not affect the lymphatic glands. It is infectious, but the exact nature of the virus is not known.

Answers to questions appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

Leishman-Donovan bodies may be demonstrated histologically. Lymphogranuloma inguinale, on the other hand, is an affection of the lymphatic glands due to a filterable virus. At the site of inoculation a papule, a nodule, or an ulcer develops about a week after exposure, but it is a transitory lesion and the affection in the fully developed case is confined to the lymphatic glands draining the area. The skin overlying the glands becomes involved only as sinuses develop.

No cases of lymphogranuloma inguinale have been reported in Canada, but the disease is now being recognized in considerable numbers in some of the United States clinics, and at least three cases have been seen in Edmonton. The first two, a man and his wife, came under observation in 1930, before I was aware of the Frei test. Both patients, however, were cured by the intravenous use of antimony and potassium tartrate. The third case was demonstrated at staff rounds in the University of Alberta Hospital a few weeks ago.

HAROLD ORR.

Edmonton,
November 10, 1934.

The Restoration of Hempstead Church

To the Editor:

Would it not be a fine gesture if Canadian universities, say through the agency of their Professors of Physiology and History of Medicine, might be able to raise a substantial sum to aid in completing the restoration of the tower of Hempstead Church, where Harvey's dust reposes? Only £2,000, we are told, are needed to complete the tower. A special fund already is provided by the Harveian Society of London for the reconditioning and rehanging of the old bells. If Canada succeeded, Australia, New Zealand and South Africa might follow suit. Some good object could easily be found for any surplus, in aid of Harvey's great watchword of progress: "to search out and study the secrets of nature by way of experiment."

THOS. GIBSON.

82 Beverly St., Kingston, Ont.,
November 12, 1934.

Since Men and Women have their proper Virtues and Vices, and even Twins of different sexes have not only distinct coverings in the Womb, but differing qualities and Virtuous Habits after; transplace not their Proprieties and confound not their Distinctions. Let Masculine and feminine accomplishments shine in their proper Orbs and adorn their Respective subjects. However, unite not the Vices of both Sexes in one; be not Monstrous in Iniquity, nor Hermaphroditically Vitious.—Sir Thomas Browne.

Topics of Current Interest

Filterable Tumours Produced by Tar

In the last few years a vast amount of research work has been done on the nature of the tar-induced tumours of mammals and on the filterable tumours of birds, with the result that important facts have been ascertained as to their chemical, biochemical, and immunological characters. The close connection between the tar tumours and the spontaneous tumours of mammals has not been doubted, but the position of the filterable tumours of birds has always been somewhat anomalous, and it is a matter of prime importance to establish a relationship between these two apparently different classes of tumour. In 1923, by means of repeated tar injections, B. R. G. Russell induced sarcomata in rats[1] and a fibrosarcoma in the fowl;[2] neither of these proved to be transplantable. Since that time many successful attempts have been made to induce malignant tumours in fowls by tar and its derivatives. Some of this earlier work has been challenged on the grounds either that the tumours resulted from contamination by virus or that they were spontaneous new growths; but there seems to be no doubt that many of the tumours were the direct result of the tar injections. Up to the end of last year no filterable tumour has been produced by tar, but now Prof. J. McIntosh has shown[3] that tumours can be produced in birds by tar injections, and that the majority of these tumours are transmissable by cell-free filtrates. The tumours obtained by him were of more than one histological type, and each type bred true in subsequent passage. The tumours occurred too frequently to be considered as spontaneous tumours, and only one tumour resembled a Rous sarcoma histologically. The fact that the same agent which gives rise to mammalian tumours is also capable of producing filterable tumours in birds provides a clear demonstration of the essential similarity of the two classes of tumour. The transmission by cell-free filtrates shows also that although tar plays the chief rôle in the induction of these tumours, it plays no part in the subsequent cancer process. This trigger mechanism of carcinogenic agents is of especial interest when considered in conjunction with the recent demonstration of the similarity of chemical structure of these agents and certain hormones. It may be that Prof. McIntosh has provided the first planks of a bridge between the adherents of the biochemical and the virus theories of the causation of cancer.—Rep. from *The Lancet*.

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1. Eighth Scientific Report of the Imperial Cancer Research Fund, 1923, p. 65.
2. Unpublished; reported by A. M. Begg and W. Cramer, *The Lancet*, 1929, **2**: 697.
3. *Brit. J. Exper. Path.*, 1933, **14**: 422.
4. Report of Miners' Phthisis Medical Bureau for the three years ended July 31st, 1932. Pretoria, 1933.

An Anti-Venom Serum for Black Widows*

A serum that counteracts the effect of the often fatal bite of the black widow spider has been perfected by Prof. Fred D'Amour, of the University of Denver. This serum is believed to be the first highly potent anti-venom serum against the bite of these spiders.

Obtained from the blood of rats that had been given small injections of venom removed from the spiders' glands, the serum first proved its worth when a vineyard worker was brought to Prof. D'Amour's laboratory suffering from a black widow spider bite. Although three hours elapsed from the time this man was bitten until a small quantity of serum was administered under a physician's guidance immediate relief was given.

Due to their alarming increase in numbers throughout the country, the black widow spiders are believed likely to become a far greater menace than the rattlesnake. For, whereas the rattlesnake is found only in isolated places, these poisonous spiders are invading cities. Lately they have been found in bedrooms and garages, as well as in furnace rooms. Several deaths from their bites have been reported in the United States within the past two years.

While the alleviation of mankind's suffering can not be measured in dollars and cents, the new serum may prove to be worth thousands of dollars to the agricultural world alone. Vineyardists in western Colorado, parts of Utah, and northern California reported several instances where entire crops of grapes were unpicked last year, due to the pickers' refusal to work in vineyards infested by black widow spiders. In some regions throughout the Midwest tomato vines were badly infested too. With a protective serum available, pickers will no longer fear to carry on their work.

Prof. D'Amour first became interested in the black widow spider upon hearing of the work of Dr. Allan Blair, of the University of Alabama. This intrepid scientist allowed himself to be bitten by a large specimen of black widow spider and suffered agonizing pain for hours, in order to allow fellow scientists to witness and record every symptom.

The bite itself is not painful, but within an hour or so after it has been inflicted a numbing pain ascends the extremity bitten and localizes itself in the abdominal muscles, back and chest. Spasms and intense suffering follow. A contraction of the chest muscles also occurs, making it difficult for the victim to breathe. High fever, nausea, vomiting and unconsciousness are other symptoms.

Previous treatment has consisted in narcotic drugs to relieve the pain, hot baths, and a convalescent serum. The latter has not been satisfactory, Prof. D'Amour said. The new serum gives prompt relief if given as long as three and one-half hours after the bite, an important practical point, since it is often people away from medical aid who are bitten.

The black widow's venom is more poisonous, weight for weight, than the rattlesnake's. The spider, known to scientists as *Latrodectus mactans*, is large and shiny jet-black, with a large bulbous abdomen and long slender legs, covering a span of nearly two inches. The lower side of its abdomen is marked with red warning signs, in most cases, by two triangular spots with points touching, roughly resembling an hour-glass. This resemblance gives the spider another of its popular names, the hour-glass spider. Far more deadly than the male, the female is four to five times as large as her mate, which she kills soon after the breeding season.

These spiders were once found only in rural districts—in grain bins, barns, chicken coops, grape arbours, etc. But within the past two years they have become extremely urban. Their webs may be recognized immediately, for they are built entirely without pattern or design, a loose helter-skelter structure of very coarse strands which crackle when torn.

The spiders are extremely timid, and, like the rattlesnake, they never attack unless molested. But the danger lies in persons unwittingly disturbing them. Many have been bitten unknowingly, grasping the spider in a cluster of grapes or in taking tomatoes from the vine. Many city dwellers have been bitten while asleep, the spider having fallen from the ceiling to the bed.—*Science News Letter*, 1934, **26:** 339.

*Dr. D. E. H. Cleveland has recently stated that this spider has appeared in the southern part of British Columbia.

(See the *Journal*, 1934, **31:** 693) [Ed.].

Medico-Legal

I.

Mlle. Bordier v. S.

Cosmetic surgery—Legal nature of surgeon's responsibility to patient—Failure of patient to return for further treatments—Obligation to explain nature of operation to patient.

Montreal papers of July last contained references to what promised to be an interesting action against a medical practitioner for improper performance of an operation to remove certain disfigurements on the plaintiff's arms. Mr. Justice Denis' decision in that action has just been published in full, and can be found in the current volume of the Superior Court reports.* Briefly stated, the plaintiff's contentions were; that she had consulted the defendant to discover if it was possible to remove some small reddish and blackish marks that had appeared on her arms; that the defendant purported to be a specialist in skin diseases; that he had promised that he could remove the

* 1934, 72 S.C. 316.

marks and; further, that only one treatment would be necessary; that he had then proceeded to cauterize the skin of her arms with external applications of some sort; and that the resulting scars, instead of improving her appearance, were more of a disfigurement than ever.

To this the defendant, without denying the fact of the treatment, replied that he had followed the procedure recognized as proper by the profession; that he had explained to the plaintiff that several treatments would be necessary, but that she had failed to return after the first; and, finally, that he had explained to her in detail what was the appropriate treatment for her condition, its consequences and duration.

On the facts of the case as they appeared in the evidence, Mr. Justice Denis condemned the defendant to pay damages of $450 instead of the $971 claimed by the plaintiff, a sum assessed partly for actual out-of-pocket expenses, partly for physical pain suffered, and partly for "un préjudice moral aussi bien que pécuniaire" that she had in the past, and would in the future, suffer. Few of the legal questions involved were considered at any length by the court, and probably in any case this is not the place for such a discussion. The court did, however, hold that the defendant could be held responsible on either one of two juridical grounds. First, as soon as the plaintiff had consulted the defendant, a contract was formed in virtue of which the defendant engaged to look after the plaintiff according to the rules of law governing such a situation and "suivant les règles de l'art". Having failed to execute this contract, the defendant was responsible in damages. Secondly, even outside of his contractual responsibility as a physician or surgeon dealing with a patient, article 1053 of the Civil Code of Quebec, which is the general article governing the responsibility of an individual for damage caused to any other individual, was also applicable. Article 1053 reads, "Every person capable of discerning right from wrong is responsible for the damage caused by his fault to another, whether by positive act, imprudence, neglect or want of skill". It is perhaps hardly necessary to emphasize that this particular case, arising in Quebec, was decided according to the principles of the civil law and not of those of the common law.

On the responsibility of a medical practitioner in circumstances such as those outlined above, Mr. Justice Denis, however, had some interesting things to say. Freely translating and paraphrasing the judgment, his remarks might be summarized as follows:

1. The surgeon who operates upon, or the physician who otherwise treats, the human body has no right, except in extraordinary and exceptional cases and in order to avoid an even greater danger, to proceed hastily, without reflection or by guess work, whatever may be the social position or the fortune of the patient, when it would be possible by the exercise of greater diligence and care to reduce the possibility of accident. The court held that, in view of the fact that the operation was for æsthetic reasons only and not in any way to prolong life or improve the patient's health, the defendant had not taken the time and precautions necessary to ensure that the operation would really improve the plaintiff's appearance.

2. Although it might be a valid excuse in certain cases that the patient had failed to return for further treatments as ordered, it is not proved in this case that the plaintiff was ever ordered to return, but that, even if she had been, the damage had been caused in the course of the single treatment she did attend and from that moment was permanent and irreparable, "dès lors, l'objection a la démanderesse de n'avoir pas recherché d'autres traitements équivaut au reproche de n'avoir pas procuré au défendeur l'occasion de lui infliger des dommages nouveaux et plus considérables encore que ceux dont elle souffre depuis le premier traitement". The patient was justified in not returning.

3. On the defendant's allegation that he had explained what he was going to do, explaining that for the red marks there would be substituted white, and that the plaintiff had declared herself quite satisfied, the court doubted the completeness of the explanation that had been made, and that in any case the defendant had sufficiently proved that he had made any explanation at all. Somewhat later the court said, in connection with this same point, that the surgeon ultimately is the only one capable of appreciating at its just value and with a view to all the consequences if his intervention is opportune and useful, or inopportune, useless, or even dangerous. In consequence, he alone must assume all responsibility, subject always to his right to protect himself by leaving the final decision to the patient. But before the patient has given her decision, the doctor must have fully and loyally explained to her all the contingencies and possible consequences of the operation. In other words, in this particular case it was no excuse for the doctor to say that he told the patient that the red marks would be changed into white marks, when he must have known that she was not in the position to know if the change would be an improvement. The defendant was under obligation to inform the patient of the exact nature of the operation, the chances of success or failure, and the consequences and the dangers of failure. If he had done so the plaintiff would undoubtedly have refused to assume the risks. (G.V.V.N.)

Abstracts from Current Literature

Medicine

How Arterial Hypertension Reveals Itself. Dubé, J. E., *L'Union Médicale du Canada,* 1934, **63**: 318.

The author remarks that it is not unusual to find persons consulting doctors for various reasons who are the subjects of arterial hypertension without being aware of it. There are scarcely any *subjective* symptoms to which they themselves attach any significance in this direction. The classical "signs" — obesity, short neck, and suffused face, need not be present. Conversely, the blood pressure may be normal or even reduced in excessively stout people. Dr. Dubé gives brief records of 8 patients who illustrated this point. Also, there are weakly individuals, with narrow shoulders and long necks who have a high blood pressure. Dr. Dubé cites 10 such cases. The widely accepted view that arterial hypertension is related to age, being found only in those fifty years of age or more, in those who have suffered from severe illnesses, who were over-worked, or who had indulged in excesses does not have a universal application; arterial hypertension may be present in young people.

The author calls attention to the well-known observation that arterial hypertension is often the expression of an increasing disturbance of the circulation due to arteriosclerosis or to chronic nephritis or to both together. However, there are many cases of hypertension unassociated with kidney disturbance, as there are many renal patients who do not suffer from hypertension. The theories as to the cause of hypertension are not universally accepted. Some think that in these cases there is an upset in the equilibrium of the sympathetic vaso-motor system; auxiliary features being over-work, over-indulgence in meat, alcohol or tobacco, and worry.

The first indications of arterial hypertension are nearly always the same. The patients complain of headache, and nearly always of shortness of breath; many of them complain of cardiac pain. In some cases digestive troubles, with vomiting, are the first things that send the patient to the physician, or dizziness, with or without headache. Sometimes apoplexy is the first indication, or angina pectoris, or acute œdema of the lungs.

There are many indications which should arouse the suspicions of the physician in regard to arterial hypertension. Such are persistent headache, ocular disturbances, epistaxis, shortness of breath. Disturbances of sensation, cramps and numbness in the extremities, and, notably, nocturnal frequency of urination, all should suggest the possibility of chronic nephritis, with its attendant hypertension. However, many of the usually accepted signs are deceptive, and in every case a careful history should be taken, a good clinical examination should be made, and an enquiry into the arterial tension should never be omitted.

JOHN NICHOLLS

The Encephalitis Epidemic in St. Louis. Barr, D. P., *Ann. Int. Med.,* 1934, **8**: 37.

The encephalitis which occurred in St. Louis in 1933 was an acute disease of relatively short duration which so far has shown little tendency to serious sequelæ. Both its incidence and its mortality were greater in older people. It was caused by a filterable virus to which both monkeys and white mice are susceptible. The sera of patients who have recovered from the disease contain neutralizing antibodies. Both clinically and immunologically the St. Louis epidemic differs from encephalitis lethargica. In about one-half the cases the onset of the disease was sudden, often with a chill or with vomiting, occasionally with convulsions. In other patients there seemed to be a period of invasion for three or four days with fever, headache, general pains, photophobia and conjunctivitis, and slight rigidity of the back and neck. The usual temperature at the height of the disease was 103 to 104°. The pulse was usually proportionate to the temperature, but bradycardia was not infrequent, which with the severe headaches, high temperature and leucopenia frequently caused typhoid to be suspected. The spinal fluid during the acute stage was often under increased pressure. The cell count in the spinal fluid ranged from 100 to 1,100, with lymphocytes usually predominant. Signs of meningeal irritation, together with the findings in the spinal fluid, often suggested tuberculous meningitis. Although diplopia was frequently noted, strabismus, ptosis, and facial weakness were relatively uncommon. Coarse tremors of the hands, arms, and of the tongue were seen in many cases. Although many patients appeared somnolent or even stuporous they could usually be aroused sufficiently to answer questions.

It appears that the St. Louis form of encephalitis had previously escaped general attention, and the circumstances of the epidemic indicate that it may appear in other communities, and presumably in the summer and autumn.

H. GODFREY BIRD

The Galactose and Urobilinogen Tests in the Differential Diagnosis of Obstructive and Intrahepatic Jaundice. Rosenberg, D. H., *Ann. Int. Med.,* 1934, **8**: 60.

The author reports on 30 cases of jaundice in which the differential diagnosis between obstructive and intrahepatic jaundice was of primary importance. The technique of the

galactose test was based on the original work of Richard Bauer. An excretion of more than 3 grams of galactose was considered a positive result and indicative of intrahepatic jaundice. The Ehrlich's aldehyde reaction was used for the detection of urobilinogen in the urine.

In all the cases of obstructive jaundice, either benign or malignant, irrespective of the duration of the jaundice, the galactose test was negative. In those with complete obstruction urobilinogen failed to appear in the urine. When the obstruction was incomplete, but of a constantly increasing degree, urobilinogen was aways detected, though never present in more than traces. In acute and subacute intrahepatic jaundice, the galactose test was found to be positive, unless the jaundice was subsiding. In all cases with this type of jaundice urobilinogen was present in the urine in variable amounts.

The author concludes that these tests are truly worthy of clinical acceptance and application. Their combined use may provide more decisive information and contribute to a more intimate understanding of the nature of the underlying disease.

H. GODFREY BIRD

Surgery

Total Ablation of the Thyroid for Angina Pectoris and Congestive Heart Failure. Mixter, C. G., Blumgart, H. L. and Berlin, D. D., *Ann. Surg.*, 1934, **100**: 570.

Total ablation of the thyroid in cases of angina pectoris and congestive heart failure is an indirect attempt to relieve symptoms. The procedure is not curative. Cooperation between physician and surgeon is an absolute essential in carrying out the treatment. Factors which are tending to lower the operative mortality are (1) the substitution of local for general anæsthesia, and (2) the reducing of pre- and post-operative sedation to a minimum. A local anæsthetic tends to separate the muscle planes and allows more accurate division of vessel branches. The tracheo-œsophageal sulcus should not be infiltrated for fear of anæsthetizing the recurrent nerve.

Distinctive voice changes may not immediately accompany unilateral cord paralysis. Laryngoscopic examination should be done when one-half of the thyroid has been removed. This examination is aided by pre-operative cocainization of the larynx. If the nerve has been damaged removal of the other half should be postponed. Usually one or more parathyroid bodies can be identified. If dissection and vessel division is done close to the gland an amount of parathyroid tissue sufficient to prevent permanent hypoparathyroidism will remain. The authors prefer dissecting the thyroid laterally and gradually approaching the isthmus from this position. Less difficulty was experienced in recognizing the recurrent nerve. Only temporary improvement is noted when a small piece of thyroid is left at each superior pole.

Permanent beneficial effects are only obtained when the basal metabolic rate drops 20 per cent or more. This level is obtained in 3 or 4 weeks. The resumption of activity must be gradual and carefully supervised.

The treatment in properly selected cases of angina pectoris is of definite value. Complete relief was obtained in 35 per cent; benefit, in an additional 50 per cent. There were no operative deaths in this group. The 15 per cent not improved had low pre-operative basal rates, and would not now be selected as suitable cases. Fifty-five per cent of the patients with congestive heart failure treated by total ablation are now working or able to work. The operative mortality was 12 per cent.

Patients were selected for operation whose pre-operative clinical course and condition was sufficiently definite to evaluate the therapeutic results of operation. A low pre-operative basal metabolic rate is a contraindication to operation. All patients require thyroid extract to control myxœdema when the metabolic rate approaches minus 30 per cent. Patients with congestive heart failure, plus signs of rapidly progressive heart disease in spite of all medical procedures, are only temporarily improved by operation. Cases of angina pectoris progressing rapidly during a relatively short period are unsuitable for total ablation of the thyroid. Previous coronary thrombosis makes the prognosis after total thyroidectomy precarious.

The indiscriminate application of this new procedure will certainly discredit the operation. Total ablation of the thyroid should only be advised after careful consideration and detailed study.

STUART GORDON

Perforation of Jejunal Ulcer into the Free Abdominal Cavity. Singer, H. A. and Meyer, K. A. H., *Arch. Surg.*, 1934, **29**: 248.

There are two principal types of complications of jejunal or gastrojejunal ulcers of peptic origin which develop as a result of the extension of an ulcer beyond the serous coat of the jejunum. These are the penetrative and the perforative.

Penetration occurs when an adjacent structure becomes attached to the base of the ulcer before actual rupture occurs. Perforation generally occurs into the free peritoneal cavity or into a neighbouring hollow viscus. Free perforation of a jejunal ulcer is of uncommon occurrence. Once a jejunal ulcer has ruptured into the free abdominal cavity and the patient has recovered, there is a predisposition to perforation in general. In some instances follow-

ing an acute perforation spontaneous closure occurs. The authors report 5 cases of perforated jejunal ulcer, with the operative measures adopted. Four of these patients recovered. In two an abscess had formed.

G. E. LEARMONTH

Obstetrics and Gynæcology

Pregnancy in Tuberculosis. Palmer, G. T., *Am. J. Obst. & Gyn.*, 1934, **28**: 173.

Pregnancy in any tuberculous woman is little short of a tragedy. No woman should consider pregnancy for at least two years after the complete arrest of her tuberculosis, and the diagnosis of arrest should not be based on merely a routine office examination. When a tuberculous woman does become pregnant perhaps the wisest course is to place her under sanatorium care immediately upon the diagnosis, and defer decision as to interruption of pregnancy for a period of three months. If the patient improves during these early months she will probably go through pregnancy satisfactorily. If the tuberculous condition grows progressively worse during the first three months, the outlook is grave and interruption is probably advisable.

Palmer's experience indicates that interruption in dormant, quiescent, or early active cases, should not be carried out until after three months of sanatorium care, with some form of collapse in suitable cases; that all patients with any degree of tuberculosis, either active or quiescent, should be under sanatorium care for the greater part of pregnancy and during the "critical six months" after delivery; that, if possible, some form of collapse should be instituted, to anticipate the sudden re-expansion of the lung incidental to the evacuation of the uterus during labour; that the labour should be made as easy as possible, with relief of pain during the first stage and the shortening of the second stage; that all children should be immediately removed from the tuberculous mother.

ROSS MITCHELL

The Presacral Nerve. Davis, A. A., *Brit. M. J.*, 1934, **2**: 1.

The presacral nerve, or superior hypogastric plexus, is never presacral, and rarely a sacral nerve. Histologically, it is composed of sympathetic nerve fibres and micro-ganglia. It is vaso-constrictor and motor to the pelvic viscera. Its pseudo-sensory properties are probably vasomotor in foundation. It is also glandulo-motor to the superficial and deep glands, and nutritional to the external genitalia. The pathology is problematical, in view of the absence of a standard of normality. The indications for its resection are limited. The operation itself, usually easy, exhibits occasional difficulties and dangers. The results of the operation in Davis's own series gave an approximate cure of 50 per cent, a considerably lower figure than most of the published statistics. Davis suggests that the operation is indicated in cases of intractable pelvic neuralgias of any type (including, of course, the dysmenorrhœas of spasmodic origin), in which minor surgical procedures had failed to relieve; in certain cystalgias and rectalgias in male patients; as an accessory to other operative procedures in the pelvis where pain has been characteristic of the case; and in certain rare cases of pruritus, after failure of the usual external procedures.

ROSS MITCHELL

Radiographic Evidence of Live Birth. Hajkis, M., *The Lancet*, 1934, **2**: 134.

Using x-rays, Hajkis was unable to demonstrate air in the stomach or intestine of still-born children, even when a large quantity of meconium had been passed. The presence of gas in the stomach and intestine is contemporaneous with respiration and independent of the ingestion of food. There was x-ray evidence of air in stomach and bowel in all of six infants with extensive atelectasis, who were born alive and survived for periods from five minutes to eight hours. Indeed, in the newborn live child which had not been fed by mouth the stomach and intestines were often outlined radiographically as if they were filled with an opaque meal. Experiments on still-born infants immediately after birth, to discover whether air can be made to enter the bowel by mouth-to-mouth insufflation, showed that even by gross exaggeration of the clinical method only the stomach could be inflated. Air in the duodenum is strong evidence of live birth. The penetration of air to the stomach and intestines is due to the vital functions of swallowing and peristalisis. In the author's opinion radiography of the lungs and intestinal tract provides the best proof of live birth.

ROSS MITCHELL

Pædiatrics

Vascular Occlusion in Pneumonia. Mead, C. I. and Bacal, H. L., *Am. J. Dis. of Child.*, 1934, **48**: 830.

These authors discuss the general subject of vascular occlusion in pneumonia, analyzing 32 cases, including 1 of their own. They comment on the great rarity of the condition.

In the vascular occlusion of pneumonia age plays little part, except that most cases occur before the age of thirty years, the period when pneumonia is most common. Males are more frequently affected than females, in the proportion of 2 to 1.

In the 32 cases occlusion occurred in the following situations and in the following proportions: right lower limb, 6; left lower limb, 5;

both lower limbs, 4; left upper limb, 2; right upper limb, 1; both upper limbs, 1; toes on both sides, 1; right foot, with superficial gangrenous patches on the right knee, elbow and shoulder, 1; one upper and one lower limb, 1; one extremity (not specified), 3; fingers of right hand, 1; cerebellar artery, 1; right Sylvian artery, 1; left hemiplegia, 1; hemiplegia and left upper extremity, 1; lenticulo-optic artery, 1; basilar artery, 1.

Eleven of the 32 patients died. In 15 of the surviving 21 gangrene developed, which did not clear as a result of canalization or establishment of a collateral circulation, and amputation was performed.

The arterial lesions were due to embolism or thrombo-arteritis. Most of the records suggest the former condition, rather than the latter.

Mead and Bacal's case was in a girl, aged 5, who was admitted to the Children's Memorial Hospital, Montreal, on September 15, 1932, with a history of having fainted four days before. This was associated with fever, anorexia, diarrhœa, and vague abdominal pain. A diagnosis of early broncho-pneumonia was made. On September 19th the child complained of a sudden cramp in the sole of the right foot, and the great toe was held in plantar flexion. On September 20th there was severe pain in the left knee and lower part of the left leg and foot. The left leg was colder than the right, the left foot was blanched, and there were scattered areas of cyanosis. There was no pulsation in the left dorsalis pedis, posterior tibial and popliteal arteries. Gangrene developed in the left foot. A line of demarcation formed in the lower part of the leg and remained stationary. On October 4th amputation was decided on, and was begun at the middle of the lower part of the leg. Pus was found beneath the fascia and the operation was not completed. During the next 14 days the child's condition improved, the pneumonia passed off, the gangrenous areas remained the same, but the pus disappeared. The leg was amputated on October 18th, and the child left the hospital well, on November 4th. The pathological report described a condition of dry gangrene; an amputation through healthy tissue; and stated that the block was above the line of amputation.

JOHN NICHOLLS

Thoracic Aortic Aneurysms in Children; their Relation to Rheumatic Fever. Calvin, J. K. and Nichamin, S. J., *Am. J. Dis. of Child.*, 1934, **48**: 780.

Aneurysms of the thoracic aorta in children, though rare, occur frequently enough to warrant attention, because a group of them are a part of the much more common rheumatic fever syndrome. The view that syphilis is practically always the cause, as in adults, is not sustained.

Up to date 44 cases of aneurysm of the thoracic aorta have been reported in persons under 18 years of age. In 21 of these there was an association with endocarditis in 10, and with rheumatic fever in 11 others. The predominance of rheumatic fever as an etiological factor is thus apparent; almost one-half of the reported cases belong to the rheumatic fever group.

In the 2 cases reported by the authors verrucæ were found on the intimal lining of the thoracic aorta, and in each the aorta had ruptured. In other cases recorded in the literature there was a primary involvement of the adventitia and media along the course of the vasa vasorum, with cellular infiltration and necrosis.

JOHN NICHOLLS

Ophthalmology

Argyrosis of the Lachrymal Sac. Gabrielides, C. A., *Ann. d'Ocul.*, 1934, **172**: 232.

The character and use of silver salts and their manifestations on the skin and mucous membranes have been known for a considerable period, from studies by chemists, physiologists and ophthalmologists.

The pigmentary manifestations of the silver salts on the eye are frequent enough, through argyrosis of the conjunctiva and cornea. Argyrosis of the lachrymal sac is probably not so rare as is thought, as often it would need an anatomical-pathological examination to verify it. Dupuy-Dutemps states that argyrosis of the lachrymal sac is not exceptional, and usually accompanies argyrosis of the conjunctiva. Many agree with this view.

The case reported is one of purulent dacryocystitis in a patient with argyrosis who was operated upon for the dacrocystitis. With the details of the case is given also the histological report, in which it is stated that the changes in argyrosis of the lachrymal sac are identical with those of argyrosis of the skin due to precipitation of the silver.

S. HANFORD MCKEE

Chronic Retrobulbar Neuritis and Amblyopias of Toxic Origin. Ray, N. M., *Brit. J. Ophth.*, 1934, **18**: 170.

In the course of hospital and private practice cases with impaired vision are met with, the correction of whose refractive error does not improve the vision, nor does the fundus show any abnormality. Some are put on a mixture of potassium iodide, and as the patients do not show any improvement they discontinue the mixture. Owing to the seriously defective vision, they become a burden to their family and an economic loss to the community. During a period of four years Ray has studied a number of these and claims to have had remarkable results in over 150 cases. The series

did not include tobacco or quinine amblyopia, but consisted mainly of cases of poisoning by heavy metals and acute infectious diseases. For a satisfactory outcome the patient must have a negative Wassermann test and the urine must be free from sugar and albumin. With the above conditions satisfied, the patient is given a course of six deep intramuscular injections of "Contramine" 0.05 to 0.25 g., according to the age, every 48 hours. Thereafter he is put on a mixture of glycerophosphates and strychnine. If a septic focus is found appropriate treatment is instituted first. As a rule the patient finds marked improvement in vision, both central and peripheral, after the injections, while the tonics improve the visual field still further. "Contramine" is an organic sulphur compound. The drug is useless in chronic retrobulbar neuritis and amblyopia caused by disseminated sclerosis, diabetes or syphilis, unless the Wassermann test is negative, and also in amblyopia *ex anopsia*. The drug may prove dangerous in nephritics or in persons addicted to alcohol. Under no circumstances should contramine be injected into a vein.

S. HANFORD MCKEE

Urology

Renal Tuberculosis as a Local Manifestation of General Tuberculosis. Bugbee, H. G., *J. Urol.*, 1934, **22**: 1.

Renal tuberculosis is always a blood-borne infection, and as such is secondary manifestation of a lesion elsewhere, the original focus being most commonly in the respiratory system. With both kidneys thus exposed simultaneously to infection, there is reason to believe that in a large proportion of cases the earliest lesions are bilateral, also that these earliest lesions are non-destructive and frequently heal. Such discrete lesions may heal in one kidney while they become advanced in its fellow; the picture then presented is the one most often seen by the urologist, *i.e.*, that of unilateral destructive renal tuberculosis. On the other hand, it is not unreasonable to assume that early renal lesions may entirely heal without ever being diagnosed, since similar healed lesions are frequently seen at autopsy in other tissues. Probably 75 per cent of the earliest renal lesions are in the cortex, and until such lesions ulcerate into a collecting tubule bacilli will not be found in the urine. Yet if such a lesion be located at the tip of a renal papilla its ulceration into a calyx may at once set free blood, pus cells and bacilli, giving rise to all the clinical manifestations of the disease.

Several careful observers have shown that in every instance in which a kidney has been found to secrete tubercle bacilli that a complete examination of that kidney will show a definite tuberculous lesion. In the examination of the kidneys of 30 patients dying of pulmonary tuberculosis without symptoms of renal envolvement, Medlar has found evidence of renal lesions in 22, with bilateral disease in every case. In 17 cases scars of healed lesions were found.

The author reports 2 cases in which kidneys were removed, one for persistent hæmaturia and one for a ureteral calculus, in which fibrotic tuberculous lesions were found without any necrosis whatever. He also reports cases of bilateral disease in which great improvement, and in some apparently complete arrest of the process, has followed proper hygienic treatment. In some cases the most extensively diseased kidney was removed even in the face of definite disease of the remaining kidney. This often allows the patient's resistance to become sufficiently elevated for the remaining lesion to heal. It is, however, essential that in every case operative procedures are to be undertaken only during periods of quiescence or when the patient's resistance has been raised to the highest possible level. If this is not observed, delayed healing of the wound may occur, genital or extra urinary lesions may become active, or miliary tuberculosis may supervene. The operative procedure is only one step in the cure and must be followed by general supportive treatment. The author's 79 operative cases are briefly reviewed and in the entire series there was no mortality.

N. E. BERRY

Neurology and Psychiatry

Histopathology of the Nervous System in Epidemic Encephalitis (St. Louis Epidemic). Weil, A., *Arch. Neur. & Psych.*, 1934, **31**: 1139.

The outbreak of epidemic encephalitis in the summer of 1933 showed several striking differences from Von Economo's classical description of the Vienna cases in 1916-17. First, the seasonal incidence did not coincide with that of the great European epidemics of the years immediately after the War. The Matheson Commission Report showed that the highest case incidence during the years 1917-27 came in the first quarter of the year. However the Japanese outbreaks of 1924 and 1927 showed their maximum incidence in the summer months, as was the case at St. Louis. Recent reports show that in many countries there has been an increase in the number of cases appearing in summer, and the comment is made that seasonal fluctuations are becoming increasingly uncertain. Secondly, the clinical picture shows a marked change from the original description. The St. Louis' cases began, as did Von Economo's series, with a mild pharyngitis and meningitis, but showed restlessness rather than somnolence; no oculomotor phenomena were noted and, up to

December, 1933, no post-encephalitic sequelæ such as chorea or Parkinsonism had been observed. Even in Von Economo's original monograph a very marked variation was noted between the later cases and those of 1916-17, and that astute observer concluded that epidemic encephalitis may show an almost incredible variability in the symptom complexes presented. He differentiated three main clinical groups: (1) opthalmological—somnolent; (2) hyperkinetic; (3) myostatic—akinetic (Parkinson). It would seem that the majority of the 1933 St. Louis cases fell into the second, or hyperkinetic, category.

It seems then that neither epidemiologist or clinician is in a position to decide whether the St. Louis epidemic differs from or is related to earlier European and American outbreaks.

The author made pathological studies of eight brains and reports the following findings. (1) Acute disseminated encephalitis and myelitis, accompanied by a mild leptomeningitis. The microscopic picture was that of (a) perivascular infiltration with small round cells and a few plasma cells, (b) isolated foci of proliferated glia. (2) Both grey and white matter were involved, but the nuclear masses in thalamencephalon and midbrain were more affected than either the cortex or brain stem. (3) In every case small cocci, either paired or in chains, were found free in the tissues, which may have been a post-mortem phenomenon. In 3 of the 8 cases colonies were found within thrombosed blood vessels and in the foci of glial proliferation which must be attributed to an *intra vitam* process. G. N. PATERSON-SMYTH

Acute Lymphocytic Meningitis. Abramson, J. L., *Arch. Neur. & Psych.*, 1934, **31**: 1235.

Under this title the author discusses a syndrome which has been frequently discussed in the European literature under various titles. The syndrome consists of a prodromal period of one to two weeks, generally with the signs of an upper respiratory infection. Then follows the sudden onset of headache, vomiting and general malaise, with a varying degree of neck rigidity and a mild Kernig sign. Pyramidal signs and cranial nerve palsies are rare, but blurring of the optic discs is not uncommon.

The spinal fluid findings are pathognomonic—increased cell count 500 to 5,000 *with an almost exclusive lymphocytosis.* Sugars, chlorides, and total proteins are normal or slightly increased. Cultures and serological tests are uniformly negative. White blood cells are rarely more than 10,000, even with more than 1,000 cells in the cerebrospinal fluid. The prognosis is uniformly good, no deaths have been reported.

In summarizing, the writer points out that the characteristic feature is the lymphocytosis in the cerebrospinal fluid. Such a picture (numerous lymphocytes in a clear cerebrospinal fluid) suggests tuberculous meningitis, syphilis, anterior poliomyelitis and epidemic encephalitis. The first two conditions can generally be eliminated without undue difficulty. The absence of paralysis in such cases and the appearance of Parkinsonian signs in several instances lead the writer to the conclusion that this syndrome is probably a form of epidemic encephalitis not heretofore recognized, and because of its uniformly good prognosis of sufficient importance to merit further attention. G. N. PATERSON-SMYTH

Dermatology

Urticaria. Hopkins, J. G. and Kesten, B. M., *Arch. Dermat. & Syph.*, 1934, **29**: 358.

Urticaria is a symptom of many diseases. Determination of the etiology varies greatly in difficulty. The authors proceed to elucidate some of the causes, as follows. (1) Contact. An antigen on an unbroken skin may occasionally cause urticaria. (2) Food urticaria is the most familiar type. However, in a series of 200 cases there were only 13 adults in whom the urticaria was caused solely by foods. (3) Serum sickness is a fairly common cause. (4) Drug urticaria is more common than generally supposed, phenolphthalein and arsenic being the commonest offenders. (5) Urticaria from inhalants is very uncommon. (6) Urticaria from bacteria and fungi. Barber has stressed the importance of foci of infection in chronic urticaria. Urticaria caused by fungi is occasionally seen. (7) Urticaria from physical agents (cold, heat and light) is uncommon, but very spectacular when it does occur. (8) Metabolic and endocrine urticaria have been described. The most common type is that associated with menstruation. (9) Constipation *per se* may cause urticaria, but uncommonly. (10) Psychogenic urticaria. Emotional stress is occasionally a cause of urticaria.

In discussing the diagnosis the authors stress the value of a careful history as an aid in determining the etiological factor. The results with protein skin tests were almost valueless. The authors made 4,300 tests with food in 214 patients, and in only 2 were the tests of any value in the diagnosis.

Although there is little evidence advanced, yet this paper is worth reading in the original because it is an excellent summary of the subject. NORMAN M. WRONG

Therapeutics

Prolonged Residence in High Oxygen Atmospheres—Effects on Normal Individuals and on Patients with Chronic Cardiac and Pulmonary Insufficiency. Richards, D. W., Jr. and Barach, A. J., *Quart. J. Med.*, 1934, **3**: 437.

The authors have kept 2 normal men and 28 patients suffering from cardiac insufficiency in atmospheres of 40 to 50 per cent oxygen for

continuous periods ranging from five days to seven months. In the two normal persons, after a week on 45 per cent oxygen, the only appreciable changes were a slight slowing of the pulse and a small rise in the blood CO_2 level.

In cases of cardiac decompensation which responded favourably, a fairly definite sequence of events occurred. (a) Dyspnœa and restlessness were partly relieved within a few hours, but completely only after several days. (b) Arterial oxygen saturation was restored to normal or slightly above normal within the first 24 hours. Rise in blood CO_2 began on the first day and was progressive for several days. (c) Increase in urinary chloride and water excretion was frequent, beginning one to six days after commencement of oxygen therapy, then proceeding to complete loss of œdema.

Eight out of 12 cases of arteriosclerotic heart disease, severely decompensated, were restored to limited ambulatory activity following prolonged oxygen therapy; 3 were temporarily improved; and 1 was not improved. Of 9 rheumatic heart cases in severe decompensation, none became ambulatory and only 5 were at all improved. Of 5 cases of pulmonary fibrosis with secondary cardiac insufficiency, all were improved and 2 restored to ambulatory activity.

The authors list the following indications for oxygen therapy in the order of their importance: dyspnœa, restlessness, cardiac pain of anginal type, arterial oxygen unsaturation, cyanosis, and, finally, cough. They stress the fact that for good results oxygen must be given not only for long periods but in high concentration. In severely decompensated cases oxygen by nasal catheter is not sufficient; the 40 to 50 per cent provided by the oxygen tent or chamber is necessary. W. FORD CONNELL

The Medicinal Treatment of Chorea (Calcium Aspirin). Mutch, N., *Brit. M. J.*, 1934, **2**: 246.

The author deals only with chorea of Sydenham's type in children. Debatable cases of adult hysteria, pregnancy chorea, and conditions such as Huntington's chorea with gross structural changes in the central nervous system have been excluded. Under general considerations, the anatomical basis, duration and recovery are discussed. The average duration is accepted usually as six to ten weeks. The cases have been divided into mild, moderate and severe. Under a somewhat similar grouping Sutton records 63 undrugged cases, with a general average duration of forty-seven days.

Therapeutic measures have been many; and are enumerated with special mention being made of nirvanol, ketogenic diet and pyrogenetic methods. The three commonest etiological factors, rheumatism, nervous strain and calcium deficiency, have led the author to adopt a gentler type of treatment. In the simple substance, calcium aspirin, we possess the means of dealing with these three etiological factors simultaneously. It supplies an adequate amount of calcium, produces a useful sedative effect on the brain, and combats the rheumatic element if given in appropriate doses. The difficulty of its instability has been overcome and can be given effectively by mouth or rectum. The solution is almost tasteless, and, being neutral, does not cause the gastric or the bladder irritation so commonly observed when aspirin itself is given (Winter and Richey). Its solubility facilitates absorption (Thompson and Dragstedt), so that its effects are produced very quickly when given by mouth or rectum. Nineteen cases are summarized, with and without heart involvement. The average daily dose varied up to 45 grains. There was no undue drowsiness or digestive derangement. There was no relapse or secondary exhaustion when the drug was finally withdrawn.

STUART R. TOWNSEND

Pathology and Experimental Medicine

A Factor from Normal Tissues Inhibiting Tumour Growth. Murphy, J. B. and Sturm, E., *J. Exper. Med.*, 1934, **60**: 293.

The Effects of a Growth-Retarding Factor from Normal Tissues on Spontaneous Cancer of Mice. Murphy, J. B. and Sturm, E., *ibid.*, p. 305.

These papers are closely related. The first deals with transplantable tumours; the second with spontaneous cancer.

The authors have based their conclusions in the first report on more than 3,800 inoculations of tumours. Extracts of dessicated embryo skin and of placenta were found to exert a definite retarding action on the growth of two separate transplantable carcinomas of mice, but had no effect on sarcomas. In the case of 828 inoculations of the tumour cells and extracts complete suppression of growth occurred in from 55 to 71 per cent of cases, as compared with 21 to 27 per cent in the controls, and even when growth was not completely suppressed some retardation was found in practically every instance. Judging from the findings in rabbits, the inhibiting substance is not demonstrable in the placenta until the beginning of the second third of pregnancy, reaches its maximum by the last third, but disappears about two or three days before term. Extracts of fresh placenta were without effect and no very definite inhibition was noted after the use of a variety of other dessicated or fresh tissues.

In the second paper the authors have tested the effects of extracts of dessicated homologous

embryo skin and placenta on spontaneously occurring mammary carcinomas in mice. They found that these extracts markedly decreased the rate of local recurrence after the surgical removal of these growths. Autografts after a short period of contact with these extracts either failed to grow, or, in a majority of cases, their subsequent growth was definitely retarded. Intraperitoneal injection of the extracts was followed by cessation of the growth of established tumours in more than two-thirds of the animals treated, and among these many of the tumours retrogressed and more than 20 per cent were completely absorbed. Mice with tumours treated with either extract rarely developed new malignant foci, though this happened frequently in untreated mice.

The authors conclude that there is no direct evidence as yet that the factor or substance in extracts of embryo skin or placenta has any relation to any control mechanism for normal cells, as some have thought. The lack of any reaction on the part of the host, and the fact that the inhibitor is effective when the tumours are treated *in vitro* before re-inoculation suggests that the action is a direct one on the cancer cells, rather than a stimulation of the natural mechanisms of resistance of the body.

JOHN NICHOLLS

The Intrapleural Pressure in Congestive Heart Failure and its Clinical Significance. Christie, R. V. and Meakins, J. C., *J. Clin. Investigation*, 1934, **13**: 323.

This is a clinical and laboratory study of the mechanism of cardiac dyspnœa. The various theories as to causation are reviewed. The authors believe that all the direct evidence in the literature indicates that cardiac dyspnœa is in some way associated with changes within the lung, rather than with central stimulation. Christie and Meakins have instituted studies on this problem by the registration of the intrapleural pressure in 7 cases of congestive heart failure. Among their conclusions are the following. In heart failure with congestion a marked decrease in the distensibility and slight impairment of the elasticity of the lung can be demonstrated. The authors present evidence which goes to show that the peripheral alveoli of the lung are over-ventilated at the expense of the deeper alveoli.

Expiration in congestive heart-failure is shown to be in part the result of positive intrapleural pressure generated by active muscular effort. The functional drawbacks of this type of expiration are emphasized, in particular, diminution in the excursion of the diaphragm, with consequent impairment of inspiratory efficiency.

Increasing the intra-abdominal pressure by means of an abdominal belt is of value in the treatment of heart failure with congestion.

JOHN NICHOLLS

Hygiene and Public Health

Cancer of the Urinary Bladder in Workers of Chemical Dye Factories and Dyeing Establishments: a Review. Hueper, W. C., *J. Ind. Hyg.*, 1934, **16**: 255.

Tumours of the bladder associated with work with aniline have been reported for many years, but until recently the reports have emanated almost exclusively from Germany. This may be explained by the fact that until the War very little use was made commercially of aniline on this side of the water. The dye-stuff industry which uses large quantities of aniline was formerly almost a German monopoly, but the War changed this, and in the United States the industry has in the past twenty years been developed on a large scale. Bladder tumours have now made their appearance among aniline workers in the United States, and it is feared that more are likely to appear. There has been much discussion as to the etiological agent in the genesis of these tumours and no common agreement has been reached. At the present time aniline, benzidin, and naphthylamine are the substances mainly accused. The time of exposure after which the development of bladder tumours has been recorded ranges from two years to more than forty. Probably the most frequent period of exposure before symptoms develop is about fifteen. Symptoms of cystitis may be associated with the development of bladder tumours, but probably the most constant sign is hæmaturia. The tumours are mostly papillomatous in nature, and vary considerably in malignancy. Many of them are fatal. The curative results so far obtained have been disappointing.

Preventive measures consist first of all in an effort to confine the fumes by the introduction of a "closed" system of production. Special clothing for the workers should be supplied and special sanitary facilities, such as shower baths and lunch rooms. A close and frequent inspection of the workers with the three substances mentioned (aniline, benzidin and naphthylamine) must be provided. This should include frequent urinalysis, and periodical cystoscopic examinations have been recommended and actually conducted in at least one plant. There can be no doubt that this type of tumour, while surgically of great interest, represents one of the most serious menaces in industry, and where the hazard exists the most painstaking efforts should be enforced for its prevention.

FRANK G. PEDLEY

Obituaries

Dr. David James Gibb Wishart. The death of Doctor Wishart occurred, after a somewhat prolonged period of gradually declining health, at his home in Toronto on December 5, 1934. Death was hastened by a recently occurring inflammatory chest condition. No death in the medical profession in recent years will have caused a more widespread feeling of regret, both among the public and, particularly, within the profession of which he had been a prominent member since his graduation.

Doctor Wishart was born at Madoc, Ont., on September 11, 1859, the son of the Rev. David Wishart and Maria (Torrance) Wishart. His father, was born

David James Gibb Wishart

at Blairburn, Perthshire, Scotland, in 1827, and pursued his education at St. Andrew's University, Glasgow University, and New College (Free Church), Edinburgh. Coming to Canada at the suggestion of Dr. Horatius Bonar he became the minister of St. Peter's Church, Madoc, where he remained for nearly forty years. He died on December 3, 1914, in his 88th year. Doctor Wishart's mother was the daughter of James Torrance, of Montreal. After the death of her parents she was brought up by her sister, Mrs. Stephenson, whose husband was one of the original founders of the medical faculty of McGill University, and, later, by another sister, Mrs. James Gibb, who occupied "Woodfield" on the St. Lawrence River, just outside of Quebec.

Doctor Wishart's early education was acquired in the Brantford Collegiate Institute, from which he matriculated to the University of Toronto in Arts, taking his Bachelor's degree in 1882. His degree in Medicine he obtained (M.D., C.M.), in 1885 from McGill University, becoming also in 1885 a Licentiate of the Royal College of Physicians, London. Other degrees held later were M.D., C.M., of Trinity University (1887) and a Fellowship of the American College of Surgeons in 1913.

All the years of his practice were spent in Toronto where he was continuously a teacher and practitioner of oto-laryngology. In the latter department he held various hospital and teaching appointments, being Chief of his Department in the Hospital for Sick Children from 1900 to 1907, on the staff in Oto-Laryngology in the Toronto General Hospital from 1890 to 1922, and Chief in Oto-Laryngology from 1914 to 1922. Similar appointments were held in the old Simcoe Street Dispensary and in St. Michael's Hospital. As a teacher he was on the staff of the Women's Medical College from 1886 to 1905, and in Trinity Medical College from 1889 to 1903, in which year, on the federation of Trinity Medical College with the University of Toronto, he became Professor of Oto-Laryngology from 1903 to 1922. He held office in various medical bodies for many years, being treasurer of the Academy of Medicine from 1907 to 1910 and President in 1917 to 1918. Memberships in medical societies were very numerous,—Canadian, British and American,—and he was very many years a member of the Senate of the University of Toronto. During the war he served with distinction at home, with the rank of Lieutenant-Colonel, as a Consultant in Oto-Laryngology. He was for many years an active member of the York Club and the Toronto Golf Club.

His society affiliations were with Ionic Lodge, A.F. & A.M., Zeta Psi Fraternity, the Æsculapian Club of Toronto, and St. Andrew's Society. Brought up as he was in the Manse at Madoc, Ont., where he was born in the autumn of 1859, he retained his Presbyterian affiliation and was at death a member of the Kirk Session of St. Andrew's Church, King Street, Toronto.

Doctor Wishart married, first, Sarah Staunton Gunther (1887) and, secondly, Rebecca Maria Gunther (1891). Dr. D. E. Staunton Wishart, of Toronto, is a son. Doctor Wishart is survived by his widow, two sons, and three daughters.

In all parts of the world where his many students have been scattered deep regret will be felt at his demise, and testimony be borne to a long life of useful work well done in behalf both of patients and of those who were his students.

An Appreciation

I have been asked to write an "Appreciation" of the late Dr. David Wishart. I take it that this means the assessing of the qualities that we value most in a man and by which we most gladly remember him. If this be so it is a pleasure to me to speak whereof I know of David Wishart and the many sterling qualities that endeared him to a host of friends.

His active surgical life, the quality of his work and the many administrative activities that were his are dealt with elsewhere. But something more personal may be recorded. By his origin and his up-bringing Wishart was made of stern stuff with strong, unyielding ideas of right and wrong, of justice and duty. An injustice done by anyone to anyone was the occasion for an outburst of indignation that could come only from one of his type. It was real righteous indignation with a sort of religious backing to it. On the other hand his satisfaction in a good deed well done by anybody was good to see, it was so sincere. He had many friends, some of them dating back to his college days at McGill University. There were those in the old residence at Toronto University and the friends of his later life were many. He had a faculty of keeping in touch with them and a reunion was to him a real pleasure, for he was a very genial man. He dearly loved to be amongst them, thoroughly enjoying himself, exchanging anecdote and joke.

He took a keen interest in sports. He played golf as a pure pleasure and not as a task, seeking to excel. He was a handy man in a canoe and a good man on a portage. The outdoor life made a strong appeal to him. At Go-Home Bay, on the Georgian Bay, there is the Madawaska Club. He, I believe, was one of the original members. At this place he had a charm-

ing summer cottage. Like all summer cottages, it started in a rather rustic way, but, passing through various stages of improvement, is now one of the best that one would wish to see. It was always full of guests, friends of his and his family. It is here that I like to recall him as host, surrounded by his friends, the hospitality as lavish as it could possibly be in such surroundings and he really at the peak of his happiness. There is one thing that always impressed me about that place—every morning there were the usual morning prayers carried out in the stern Presbyterian fashion. It was to him one of the events of the day. It reflected the type of man he was, the type of upbringing he had, and everybody admired him for it and they themselves enjoyed it.

There is lost to us a striking land-mark in the medical world of the last two decades; a man full of years and full of honour, of good report amongst his fellows; a gentleman endeared to his friends; a good husband and a wonderful father. We shall miss him sadly.

HAROLD PARSONS

Dr. I. W. N. Baker died in Sussex, N.B., on November 27, 1934. Dr. Baker was seventy-three years old, and had practised in Centreville, Saint John and Sussex.

Dr. Elisée Bellemare died at St. Barnabé North, Que., on November 18, 1934. He was born at Yamachiche in 1853, the son of Antoine Bellemare and Rose Descoteaux. He conducted his classical studies at Nicolet Seminary and graduated in medicine from Victoria University in 1879.

Dr. Bellemare was married first to Mlle. Parmélie Martel and, secondly to Mlle. Eléonore Bald. He is survived by his widow and two sons, Rev. E. H. Bellemare and Dr. L. Eugène Bellemare.

Dr. Michael Joseph Brown, of Toronto, died suddenly, at his home, on November 11, 1934. He was born in 1893, the son of Dr. and Mrs. Peter J. Brown, and a graduate of the University of Toronto (1920). He is survived by his widow, formerly Venite O'Connor.

Dr. Brown will long be remembered by a host of friends and patients throughout the eastern section of the city, in which he was noted for the large amount of charitable work he did among the poor.

Dr. Bernard Miville Deschenes died at St-Pascal de Kamouraska on November 21st at the age of 65. He had been ill for several years and had had a severe stroke a few days before his death. He studied at the College of Ste-Anne-de-la-Pocatière, and the University of Laval, Quebec, where he took his degree in medicine in 1895. He then returned to his native county of Kamouraska and established himself in general practice, which he followed for nearly 40 years.

Dr. John Duncan, of Toronto, died on November 22, 1934, at his home. He was born in 1875 and was a graduate of the University of Toronto (1906). He is survived by his widow, formerly Oda Weldon.

Dr. William Elliott died at his home at Wolseley, Sask., on October 29, 1934, following a heart attack. He was 71 years old and had been a resident of Wolseley for 41 years.

Born in 1863 at Mitchell, Ont., Dr. Elliott received his primary education at the Jones School at Logan, finishing in Mitchell High School. He attended Toronto University, graduating with honours and as gold medallist from the medical college in 1893. That year he came west, establishing his office at Wolseley.

In 1898 he was first elected to the Territorial legislature, and again in 1902. In 1903 he was named Minister of Agriculture for the territories, in the cabinet of Hon. F. G. Haultain. He was elected to the first provincial legislature in 1905 and again in 1908.

Though prominent in public life, he will best be remembered for the work of his profession. As a doctor, it has been said that he never failed to answer a call. The period best remembered by his friends was in 1900, when epidemics of the scarlet fever and diphtheria struck the Wolseley district. He did not know what a night of rest meant during that period.

With his passing the medical profession suffers a deep loss.

Dr. George W. Fleming, of Petitcodiac, N.B., died in Montreal on November 7, 1934. Dr. Fleming was born in Chipman, N.B., 73 years ago. In early life a school teacher, he graduated in medicine from McGill University in 1893, locating immediately in Petitcodiac, where he has since continuously practised. Dr. Fleming was an active member in local affairs, being chairman of the school board and holding other parish offices. He was a Baptist and a Mason. He was a past-president of the New Brunswick Medical Association, and was widely known throughout New Brunswick as a man of sterling character and of a most remarkable generosity.

Dr. Beverley Zey Milner. Stricken with a heart attack as he was coming from treating a patient, Dr. B. Z. Milner, of Toronto, was found dead, slumped over the steering wheel of his automobile, on December 7, 1934.

Dr. Milner was well known in Toronto medical circles. He was born in Stratford 69 years ago, the son of Rev. Jonathan Milner, a Methodist clergyman of Toronto. Dr. Milner received his earlier education in Woodstock and Barrie high schools, and received the degree of M.D., C.M. from Trinity University (1889).

For many years he was associate head surgeon of the Hospital for Sick Children. He later became surgeon-in-chief, in charge of the outpatients department at the Toronto General Hospital. He served in that capacity for eight years.

At the time of his death Dr. Milner was Honorary Consulting Surgeon to the Hospital for Sick Children and a Fellow of the Academy of Medicine.

He is survived by his widow, Clare Maud Aitken; a son, Beverley, of Toronto; and two daughters, Marjorie and Dorothy, at home.

Dr. J. D. George Tassé died at his residence, Iberville, Que., on November 24, 1934, in his 72nd year. A well known and greatly beloved figure in public life of St. Johns and Iberville, he had practised medicine there for a period of 45 years. Of recent years the doctor had given up his practice, being confined to his home through illness.

Born in Iberville in the year 1863, Dr. Tassé studied at St. Hyacinthe, Que., later attended the Jesuits' College in Montreal, and graduated from Victoria University in 1888. He was appointed physician for the Grand Trunk Railway and later was a councillor in his home town. He leaves to mourn his loss, his widow, formerly Hermine Dalbec; one son, Alain, of Iberville; one daughter, Mrs. P. Painchaud, of Quebec City; four brothers, Dr. Victor Tassé, Worcester, Mass., Gustave, Victor and Romuald, all of Montreal; two sisters, Mrs. Alfred Gouin, Three Rivers, and Mrs. Walter Tressider, of Montreal.

Dr. John Henry Watson, of Toronto, died on November 16, 1934, in his eighty-eighth year. He was born at Bond Head, on October 27, 1847, and graduated from Victoria College in 1869. In his youth he was a noted cricketer, and was reputed to have played on every cricket field between Toronto and Collingwood. He commenced medical practice in Barrie, where he established himself as a skillful obstetrician. Surviving are two daughters, Mrs. F. W. Thorold, Niagara Falls, N.Y., and Miss Gertrude Watson, at home; a son, Dr. George A. Watson, Detroit; a sister, Mrs. Carrie Shewan, and a brother, Albert Watson, both of Bond Head. He was pre-deceased by his wife twenty-five years ago.

News Items

Great Britain

William Harvey's Church.—An appeal is made to the medical profession to subscribe to the fund that has been open for more than a year, having for its object the completion of a new tower for Hempstead Church, Essex, where Harvey's remains lie. These remains are in a marble sarcophagus provided by the Royal College of Physicians of London to which they were transferred 51 years ago to the Harvey vault.

Hempstead Church is a fourteenth century building, and the transactions of the Essex Archæological Society record that the church and surrounding cemetery were consecrated in 1365 by the Bishop of London, Simon of Sudbury. The tower of the ancient church collapsed in 1882. Ten years ago a movement was set on foot to restore or rebuild the tower, and local subscriptions to that end were made, but the time was inauspicious, and local generosity was not supported. At the tercentenary celebration of the publication of the "De Motu Cordis", held at the Royal College of Physicians of London in 1928, it was felt that a memorial to the founder of scientific medicine should take the form of the restoration of the church which harboured his bones. A committee was instituted by the College to give effect to the strongly felt sentiment, a restoration fund was opened, and on July 7, 1933, the foundation-stone of a new tower to Hempstead Church was laid by Lord Dawson. The work was set in hand in response to the first donations received, and the reconstructed tower has now been built up to a point, about two-thirds of the total height. The first portion of the new tower, built largely from the original stones, has been covered in, so as to render the building suitable for services, and the completion now should certainly wait no longer. The present appearance of the structure seems to convey a reproach to us all from the great dead. Accordingly a further appeal for the sum of £2,000 necessary to finish the work is made to the whole medical profession. The members of the Harveian Society of London, to mark their centenary in 1931, instituted a special fund for the reconditioning and rehanging of the bells. These were originally five in number, but on the collapse of the tower one bell was hopelessly shattered.

Donations are invited from all members of the medical profession and should be made payable to the Harvey Memorial Fund and sent to Dr. G. de Bec Turtle, Royal College of Physicians of London, Pall Mall East, London, S.W.I.

The Council of The Medical Society for the Study of Venereal Diseases offers an Honorarium of £25 for the best critical Review dealing with any of the venereal diseases considered from any angle.

The selected review shall become the property of the Council.

The Council shall be at liberty to publish in *The British Journal of Venereal Diseases* any paper other than the one to which the prize is awarded.

Contributions, of about 6,000 words, should be typewritten on one side of the paper only, with a quarter of a page as a margin, and sent to the Hon. Secretary, "M.S.S.V.D.", 43 Queen Anne Street, London W.1., before March, 1935.

Carlyle Thornton Potter, M.D. (McGill), was admitted to membership in the Royal College of Physicians of London on October 25, 1934.

Alberta

Recently a meeting was held in Calgary at which were present the members of the Executive Committee of the Association of Rural Municipalities and officers of the College of Physicians and Surgeons of Alberta and the Alberta Medical Association. The topic of discussion was adequate medical care and attention to indigents. No conclusion was arrived at, except, that the responsibility was on the municipalities, which responsibility they were desirous of assuming in a reasonable manner, providing some system other than the everlasting dispute as to what constitutes an indigent were adopted. A committee of the Association is to meet the Council of the College of Physicians and Surgeons in Edmonton about the middle of December.

A luncheon was given to Dr. Owen, of Notikewin, who was in the city of Calgary. She is located in the far northern part of the Peace River District, on a salary basis, practising among recent settlers, who had no chance to make a stake prior to the depression. Pioneer physicians of the eastern provinces "have nothing on" Dr. Owen for hardships; where they travelled miles, she travels leagues or more.

It is reported, that whereas there were 16 per cent of the jail admissions with syphilis fourteen years ago, only 7 per cent were syphilitic in 1933. Whether this means better health or a different type of prisoners has not been stated. There are six treatment clinics in the province at the present time, the two latest being in the Health Units.

A resolution was presented at the recent meeting of the Association of Rural Municipalities which read:

> "Whereas the cost of indigent medical relief is increasing, therefore be it resolved that the Municipal Districts Association take the matter up with the Alberta Medical Council to arrange for a 50 per cent rate for indigents."

There are three constituencies electing councillors for the College of Physicians and Surgeons this fall. In Calgary, Dr. R. B. Francis was returned for another two years, by acclamation; in Lethbridge Drs. W. S. Galbraith and A. Cherry are in the field, while in Camrose District Drs. W. V. Lamb, J. J. Dobry and H. C. Wallace are running.

G. E. LEARMONTH

British Columbia

A civic committee recently met representatives of the Vancouver Medical Association and agreed to extend until March, 1935, the arrangement between the city and the Association under which medical attention is provided to city relief recipients.

At present the city and province each pays $1,500 monthly as a medical fund. Relief patients are attended by their own physician, who sends his bill to the Medical Association. Payment to the physician is made from the fund on a *pro rata* basis after the approval of his bill by a special committee of the Association. The arrangement started in January and the city's participation was due to end at the close of the fiscal year, on December 31st. The city, however, has agreed to extend the arrangement until March, when the provincial fiscal year will close.

D. E. H. CLEVELAND

Manitoba

The various reports of the Winnipeg General Hospital presented at the annual meeting, November 13th, show an increase in ward and departmental earnings and a decrease in operating expenses. The revenue exceeded operating expenditure, but this did not offset the financial

charges. During the year the lowest records of occupancy and income for a decade have been reached and passed. Occupancy rose to 79 per cent, but the proportion of private and semi-private patients continued low. Seventy per cent of the hospital indoor services rendered was on the public wards.

Though economic conditions are undoubtedly improving, there still remains a strong tendency among those paying their own way to postpone hospital treatment or remain at home. The semi-public service (public ward patients admitted under their private doctors) was made available the previous year and is growing in popularity, and now there are almost as many patients sent to the public wards under their own physicians as under the honorary attending staff. The result has been to reduce considerably the number of teaching beds and to embarrass the Medical College of the University of Manitoba which looks to the General Hospital to provide at least 70 per cent of its teaching facilities.

The per capita per diem costs covering all maintenance, including financial charges, is $3.20, which is 15c. less than the previous year. The operating costs including equipment and expenditure, but excluding financial charges, is $3.00. With out-patients excluded the operating cost is $2.89.

Dr. Bruce Chown has been appointed Pathologist to Grace Hospital.

The annual St. Luke's day service of the Winnipeg Medical Society was held at the First Presbyterian Church, the minister of the church, Rev. Gordon MacLean, conducting the service.

The Municipality of Woodsworth, a rural municipality with a comparatively stable population, is about to undertake the experiment of providing medical and hospital care for all persons residing in the municipality. The experiment is to be carried out with the approval of the Minister of Health and Public Welfare of the province. The Manitoba Medical Association has set a schedule of fees which are practically those of standard rural practice. Patients are free to call any doctor, but in no case must the charge to the municipality be greater than if the nearest doctor had been called. While the details of the financial "set-up" have not been announced it is expected that a certain number of mills on taxable property will be set aside by the municipality to cover the expenses of the scheme. The experiment will be watched with much interest.

Dr. F. W. Jackson, Deputy Minister of Health, addressed a public meeting at Oak Lake on the evening of November 21st on the subject of municipal doctors and the health insurance scheme proposed for the near-by Municipality of Woodworth. After discussing the various points of each the meeting signified its approval of the latter scheme, and Dr. Jackson explained that the Health Department was anxious to try out the health insurance plan. As a result of the meeting there was a possibility that such a scheme may be carried out in the Oak Lake district.

Dr. E. S. Moorhead, of Winnipeg, and Dr. F. W. Jackson, Deputy Minister of Public Health, addressed meetings at St. David's and Kenton in the Municipality of Woodworth on November 22nd in connection with the health insurance scheme which it is proposed to put in force in that municipality. Much interest was manifested in the idea.

ROSS MITCHELL

New Brunswick

On November 30, 1934, the Commissioners of the Saint John General Hospital tendered a luncheon to Dame Janet Campbell. Dr. H. I. Taylor, Provincial Minister of Health, in his introductory remarks at the luncheon, complimented the visitor on her distinguished record and accomplishments in the service of the Ministry of Health of Great Britain. In her reply Dame Janet Campbell rapidly sketched the progress of health measures in Great Britain from the time of Elizabeth to the present satisfactory panel system and the municipal hospital. The luncheon was attended by the members of the Saint John Medical Society as guests.

The first of a series of exchange programs sponsored by the New Brunswick Medical Society was held at Fredericton on November 27, 1934, when Dr. W. O. McDonald addressed the Medical Society on some aspects of diabetes. He was followed by Dr. George M. White, whose paper dealt with "Heart disease in pregnancy". These papers were discussed by Drs. Irvine, G. Clowes VanWart, Robertson, Stirling and others. A program of such meetings is scheduled in an endeavour to bridge the gap caused by the withdrawal of the Sun Life contribution for extra-mural lectures. Speakers for these tours are to be provided from within the province.

On November 20, 1934, a clinical meeting was held at the Saint John Tuberculosis Hospital, to which all of the practising physicians in Saint John and neighbourhood were invited. They were addressed by Dr. W. R. McAusland, of Boston, whose subject was "The diagnosis and treatment of fractures".

The Anti-Tuberculosis Association of the City of Saint John have been providing a series of public lectures and radio broadcasts on the subject of tuberculosis, its prevention and cure. Dr. R. E. Wodehouse, Deputy Minister of the Department of Pensions and National Health, was a visitor to Saint John in this connection.

Dr. J. C. Mehan, of Bathurst, recently celebrated the completion of fifty years' practice in medicine. During this whole time Dr. Mehan has been located in Bathurst.

It has been announced that Dr. George M. White, of the Obstetrical Staff of the Saint John General Hospital, has been appointed to the examining board in Obstetrics for the Dominion Medical Council.

A. STANLEY KIRKLAND

Nova Scotia

Dr. Janet Campbell, a member of the Health Committee of the League of Nations, and previously senior medical officer for "Maternity and Child Welfare" of the British Ministry of Health, spent a few days in Halifax before returning to England. She had been on a lecture tour throughout Canada. While here she addressed a meeting, open to the public, on "Maternal welfare". On December 3rd, she also addressed a meeting of the medical students of Dalhousie University.

The Mental Hygiene Society, at its recent meeting, passed a resolution urging that in any projected rebuilding of the Victoria General Hospital, adequate plans be made for modern psychiatric facilities for early and enlightened treatment of mental illness. It was pointed out that a 50-bed wing of the hospital would fill such a need.

The Children's Hospital of Halifax again benefits through the generosity of Mr. O. E. Smith, whose latest contribution is the sum of $5,000 towards retiring the debt of the institution. Previously Mr. Smith had given a much greater sum towards reducing the interest on a bank overdraft.

A semi-annual meeting of the Western Counties Medical Association was held recently at Yarmouth. Guest speakers at this meeting were Drs. H. K. MacDonald and H. G. Grant, of Halifax. The Eastern Counties Medical Association held its 30th annual meet-

ing at Antigonish early in November. Twenty-three doctors were in attendance. Dr. J. S. Brean, of Mulgrave, was elected President for the next year.

Dr. Harry O'Brien, of Halifax, was elected a Fellow of the American College of Surgeons at its recent meeting in Boston.

Dr. Martin Silberberg, formerly attached to the Pathology Department of the University of Breslau, will carry on research in the Pathology Department of Dalhousie University. Dr. Silberberg is an exiled German scholar. He is in receipt of a grant from the Carnegie Foundation for two years. He has spent some time on this continent, previously having been associated with the late Professor Maximov, of Chicago University, and with Professor Loeb, of Washington University.

Mr. Thomas Malcolm Martin, who was completing his final year of the study of medicine at Dalhousie University, died from pneumonia while acting as interne at the Aberdeen Hospital, New Glasgow. Mr. Martin came here from the University of North Dakota, where he completed his pre-clinical studies. He was a keen student, and in his fourth year he was awarded the Prize in Medicine. His loss is mourned by both staff and students.

N. B. DREYER

Ontario

The Hon. Dr. J. A. Faulkner, Minister of Health for Ontario, has appointed a new Cancer Commission which will be split up into four sub-committees, each with a definite program. Outstanding medical men have accepted positions on the sub-committees. The establishment of three radium clinics, one in each of the cities of Toronto, London and Kingston, has already been carried out by the government, in accordance with recommendations of the Royal Commission on Cancer.

While convinced that the use of radium in treatment of cancer results in many benefits to sufferers, the Provincial Government does not intend to contract for further purchases of radium until the sub-committee on radium and x-rays brings in its report of general conditions. The province has already spent $300,000 on radium purchases. The radium and x-ray committee, headed by Prof. Oskar Klotz, of the University of Toronto, will study the question of distribution of radium with regard to population, techniques in vogue, methods of application and similar problems. The report of this committee will aim at creating uniformity of treatment.

Members of the Cancer Commission are: Hon. Dr. J. A. Faulkner, Minister of Health; Dr. W. J. Bell, Deputy Minister; Dr. J. W. S. McCullough, Chief Inspector of Health; J. D. Leitch, Secretary to the Commission; Dr. George E. Richards, Director of the Department of Radiology, University of Toronto; Prof. J. G. FitzGerald, Dean of the Faculty of Medicine, University of Toronto; Dr. W. E. Gallie, Professor of Surgery, University of Toronto; Prof. E. F. Burton, Director of the Department of Physics, University of Toronto; Prof. Oskar Klotz, Professor of Pathology and Bacteriology, University of Toronto; Dr. G. E. Wilson, Assistant Professor of Clinical Surgery, University of Toronto; Prof. Duncan Graham, Professor of Medicine, University of Toronto; Dr. W. A. Jones, Director of the Radiological Division, Kingston General Hospital; Dr. Frederick Etherington, Dean of the Medical Faculty, Queen's University; Dr. W. T. Connell, Professor of Medicine, Queen's University; Dr. R. K. Paterson, Radiologist, Ottawa Civic Hospital; Dr. W. J. Cook, Medical Officer of Health, Sudbury; Dr. F. J. H. Campbell, Acting-Dean of Western Ontario University, London.

Dr. Kenneth McKenzie, of Toronto, addressed the South Waterloo Medical Society on November 28th, on the subject of "Brain abscess".

Dr. A. R. Dafoe addressed the Academy of Medicine, Toronto, on December 4th, describing his professional experience with the Dionne quintuplets, in an address illustrated by lantern slides and moving picture film under the title of "A medical fairy story".

At the 47th annual meeting of the Hillcrest Convalescent Home, it was decided that the name be changed to "Hillcrest Convalescent Hospital".

On November 29th, the new wing of the Toronto Hospital for Incurables, which is known as the Jubilee Wing, was formally opened by Mrs. Herbert Bruce in the absence of her husband, the Lieutenant-Governor of Ontario. At the close of the hospital year 336 patients were in residence.

Dr. W. J. O'Hara has been appointed a Coroner for the City of Toronto and the County of York.

J. H. ELLIOTT

An Osler Memorial Day is to be inaugurated in Hamilton, Ont., under the auspices of the Hamilton Academy of Medicine, and will be held on Wednesday, February 27, 1935. The various exercises will commemorate the anniversary of the publication of the late Sir William Osler's first paper, "Christmas and the Microscope". Preparations are being made for a large attendance of physicians and laymen. The morning will be devoted to ward rounds, surgical operations, bed-side clinics, and demonstrations in the various branches of medicine at the General Hospital and at St. Joseph's Hospital. Then will follow a noon luncheon to which the public is invited. The chief address at that function will be by a former pupil of Osler's, Dr. T. B. Futcher, of Baltimore. The afternoon session will be held at the Mountain Sanatorium, where demonstrations and clinics will be given by the staff, illustrating the various phases of therapy of pulmonary tuberculosis.

It is expected that the first Osler Day in Hamilton will attract disciples from distant places, and, accordingly, for their exclusive participation, a pilgrimage to Osler's Shrine will be arranged. At a late hour in the afternoon the pilgrimage will proceed from the Sanatorium to Dundas, pass the location of the "Water Trough", inspect the cairn erected by the Hamilton Academy of Medicine between the highway and the hillside overlooking the marsh. This cairn marks the path which William Osler followed in pursuing his early scientific investigations. The expedition will probably include a visit to the old rectory and also to the house previously occupied by Dr. Holford Walker and since that time by Dr. Bertram. An informal dinner for the pilgrims will follow.

Another feature of the day will be the award of the prize for the best essay on "The life and work of Osler". The competition will be open to third and fourth years McMaster University students. The presentation will take place at the luncheon.

In view of the large amount of clinical material available at these hospitals and the intimate association of Osler with the district, an interesting and instructive day is promised.

J. HEURNER MULLIN

Quebec

Montreal's newest place of healing—St. Mary's Hospital—was officially opened recently in a brief but impressive ceremony that saw Church, State and civic representatives united in praise of English-speaking Catholics whose untiring efforts made the construction of the modern 200-bed institution possible. The eight-floor building on Lacombe Avenue, just west of Côte des Neiges road, was officially opened by Msgr. Georges Gauthier, Coadjutor Archbishop of Montreal. From his sick bed at Woonsocket, R.I., where he was recuperating from a serious illness, the Archbishop pressed a button that released the Union Jack draped over the entrance on

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ALPHAMETTES

the main floor. At the same time the prelate's voice, declaring the hospital open, was heard over the loud-speakers placed at strategic points throughout the building. The ceremony commenced promptly at 2.30 o'clock, when Msgr. E. A. Deschamps, Auxiliary Bishop of Montreal, entered the spacious lobby on the first floor, and in a brief religious service blessed the building.

T. Taggart Smyth, president of the hospital, welcomed the guests, who included Msgr. Deschamps, Premier L. A. Taschereau, Mayor Camillien Houde and Hon. J. H. Dillon, K.C., M.L.A.

The fact was stressed that the new hospital was not open only to English-speaking Roman Catholics, but was available for all, irrespective of race, creed, or colour.

Dr. G. N. Paterson-Smyth has been appointed Chief Neurologist to the Women's General Hospital, Westmount, Que. A graduate of McGill University (1927), Dr. Paterson-Smyth spent two years at Montreal General Hospital, one year in pathology and an additional year in the study of neuropsychiatry. Serving for 12 months at the Boston Psychopathic Hospital with Dr. MacFie Campbell, Dr. Paterson-Smyth continued his work for the next six months at Queen's Square Hospital, London, with Dr. Collier and Dr. Kinnier Wilson, after which he returned to Montreal.

His return here was followed by six months' in neuropathology under Dr. W. G. Penfield, after which he took up the practice of neuropsychiatry. He now holds appointments as Assistant in Neurology to the Montreal General Hospital, Psychiatrist to the Protestant School Board of Montreal, and Lecturer in Neuropsychiatry at McGill University.

Dr. Arthur Lessard, of Montreal, for 18 years superintendent of Notre Dame Hospital, has been appointed inspector-general of all institutions in the province which come under the Public Charities' Act. Dr. Lessard, whose post is a new one, will be specially charged with seeing that patients in these institutions do not remain in them any longer than is necessary, so as to permit the institution to care for as many patients as possible. He is one of Montreal's leading experts in hospital administration as he was secretary of the bureau of administration of Notre Dame Hospital for 10 years and superintendent of the same institution for 18 years.

Dr. Lessard was born at St. Joachim de Montmorency, and, after a classical course, he completed his medical studies at Laval University in Quebec, where he graduated in 1894. He had practised 17 years in Granby before he was given the appointment at the Notre Dame institution. He is also a past-president of the Montreal Hospital Council, of which he is one of the founders.

The Lake Edward Sanatorium, of which Dr. J. A. Couillard has been Director for the last twenty years, has been fully approved by the American College of Surgeons.

United States

American Radium Society.—The following resolutions have been adopted by the American Radium Society at their Annual Meeting, Cleveland, June 12, 1934; and also approved by the American College of Radiology, June 12, 1934, and by the Section of Radiology, American Medical Association.

WHEREAS it is now recognized that radium has been demonstrated to be of definite value in the treatment of disease, and that funds are not always available for the purchase of suitable preparations of radium for use by those physicians who are qualified in radium therapy; and also that we recognize that radium is an agent quite as potent for doing harm as for doing good when used without sufficient skill or training and with the hope of protecting the uninformed public from serious and irreparable injury from improper and insufficient treatment.

BE IT RESOLVED that we consider it improper, unethical and detrimental to the science of Radiology and to the good of suffering humanity for commercial laboratories to attempt to give advice or directions as to the use of radium in the case of a patient whom the person giving that advice has not even had the opportunity to examine. In other words, it is just as difficult to give such advice and directions as it would be for a surgeon to give directions for the use of rented surgical instruments so that an untrained physician might attempt an operation. Various commercial companies advertise both in the journals and through the mails, medical advice for the purpose of making sales or renting radium or radon. This places these corporations in the field of practising medicine.

BE IT RESOLVED that the same criticism be applied to institutions which rent or furnish their radium to those members of their staff or outside of the staff who are unskilled in radium application; also that the same criticism applies to many individual owners of radium.

RESOLVED that we recommend the refusal of advertising matter in national and state journals when the companies concerned are advertising a medical consulting service or are advertising such service through the mails in connection with their sale or rental of radium; also that we disapprove of any doctor's acting as a consultant to a commercial company carrying on such a campaign of public or private advertising and that we consider such an association sufficient grounds to warrant disbarment from the approval of the National Board of Radiological Examiners.

RESOLVED that we recognize the ethical commercial company as a necessity. It is the advertised consulting service that is at fault. It is recognized that such restrictions on the advertising of a medical service will in no way hamper properly qualified radium therapists in obtaining adequate supplies of radium or radon for the purposes in which they are qualified to use it.

RESOLVED that we approve an informal medical consultant for the guidance of those commercial companies who refrain from advertising such professional service, either publicly or privately and that in such case their informal consultant be one approved by the National Board of Radiological Examiners.

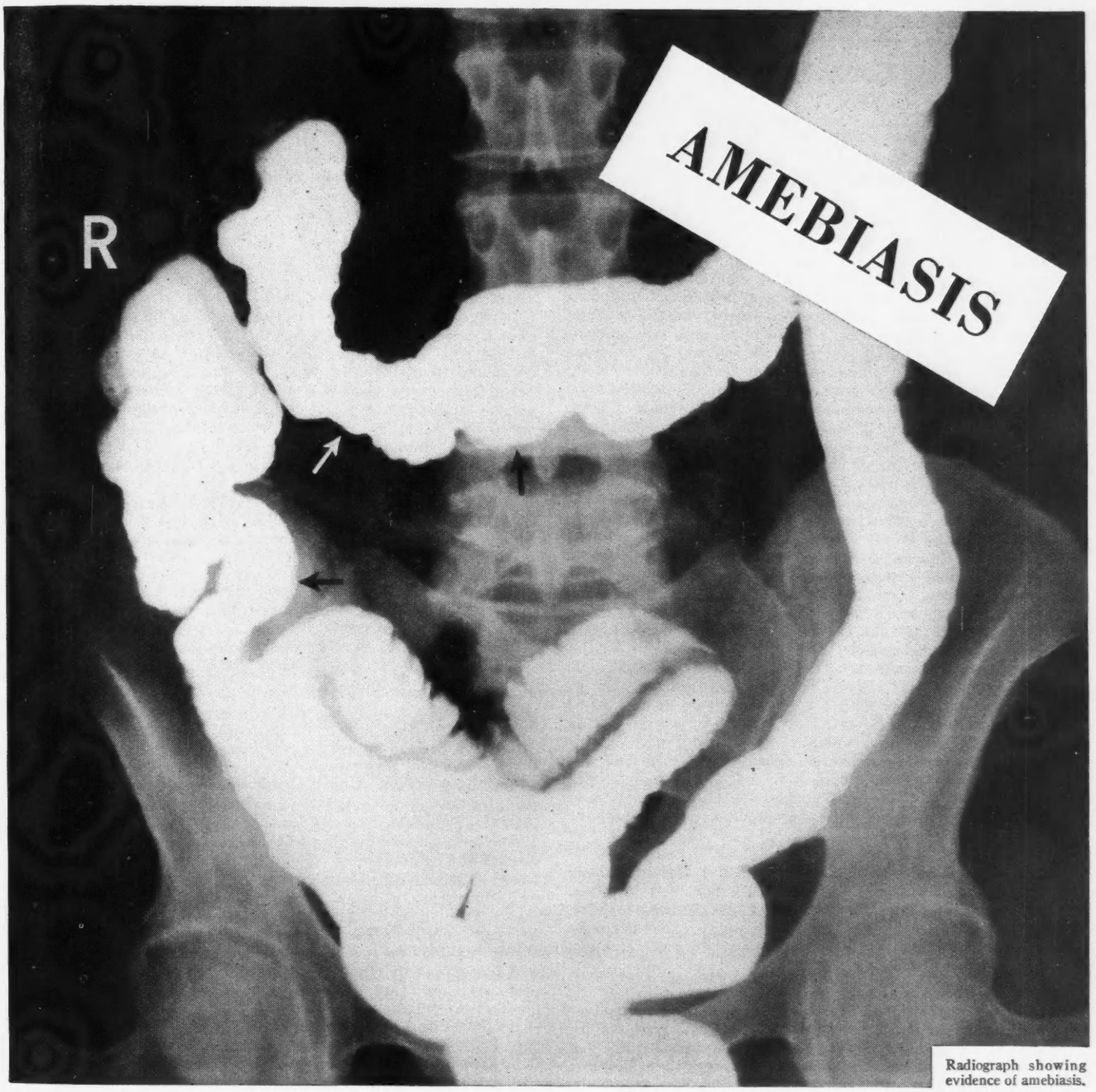
Also, the following resolution was presented by the Executive Committee and adopted unanimously by the American Radium Society, Cleveland Session, June 12, 1934.

WHEREAS, it has been proved that radium and x-rays, when used properly, and in sufficient quantity, is efficient in the treatment of cancer in certain locations, and

WHEREAS, there is a general fear in the public mind from x-ray or radium burns, which because of this fear, prevents competent radiologists from using sufficient radium or x-ray to produce the best results.

BE IT RESOLVED that we as radiologists recognize that in the treatment of malignant disease, it is often necessary to carry the treatment on to the extent of producing a violent reaction in the surrounding tissues, which may cause the skin to peel, and blisters to form, in order to give sufficient treatment to overcome the malignant disease. We believe, therefore, that it is justifiable to produce a second degree radiodermatitis when necessary.

University of Pennsylvania.—The University of Pennsylvania has established a second professorship of medicine and has elected Dr. O. H. Perry Pepper to that post. The term of Dr. Alfred Stengel, the present professor of medicine, was extended for three more years, although he had reached the age of retirement, after a service of forty-one years. Dr. Pepper, who is a brother of Dr. William Pepper, dean of the school of medicine, is the third member of his family to be elected professor of medicine at the university. His grandfather, Dr. William Pepper, held that position from 1860 to 1864, and his father, Dr. William Pepper, who died in 1898, was also professor of medicine for a number of years, as well as provost of the university.



Radiograph showing evidence of amebiasis.

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During treatment, radiographic evidence of any new lesions or of the recurrence of old lesions is an invaluable guide in the proper management of the case.

In situations where you suspect amebiasis and in cases already under treatment, make it a routine to use the services of your radiological consultant. The graphic information he can supply will prove a great aid in bringing such cases to a satisfactory conclusion.

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Book Reviews

Our Heritage and Other Addresses. Col. the Hon. Herbert A. Bruce, R.A.M.C., M.D., L.R.C.P., F.R.C.S., LL.D., Lieutenant-Governor of Ontario. 392 pages. Price $2.50. Macmillan Co. of Canada, Toronto, 1934.

Those who have a spare half hour can take up this book with delight and with profit. Indeed, we think that the half hour will likely expand into an hour or even more. The beauty of it is that one can dip into the book at any point. It is a collection of addresses on a great variety of topics delivered before a great variety of public bodies. There is no necessary chronological order, nor is there any grouping of subjects. Everyone can find something to interest him.

It is a difficult book to review; not that it deals with particularly abstruse topics, but because of the versatility of the author, a versatility that most reviewers do not share. As becomes a member of the medical profession Col. Bruce has given us his thoughts on medical or near-medical subjects—The Romance of Surgery, the Propagation of the Unfit, Sterilization of the Feeble-minded, Cheaper Convalescence, The Story of Dentistry, the Work of Healing and the Healing Power of Work, Quacks v. Science, the Literary Practices of Some Medical Practitioners, Concerning Infantile Paralysis, Nursing, Past and Future, Health and House, but apart from these we have discourses on such unlike topics as Blue-Stockings and the Education of Women, Flowers, Youth and Education, On Art as History, British Aviation, Freemasonry, The Loyalists of Canada, Our Inheritance, The British Empire, and Slums. But we need not go on; we should leave something unsaid, as an additional attraction.

The book is well worth while publishing, if only to bring before the intellectual public in a forceful way the menace to our civilization of slums and feeble-mindedness. It also well portrays one important aspect of the multifarious duties incumbent on Lieutenants-Governor.

All in the Day's Work; Leaves from a Doctor's Case-book. Abraham Groves, M.D., formerly Medical Superintendent of the Royal Alexandra Hospital, Fergus, Ont. XIV and 181 pages. Frontispiece. Price, $3.00. The Macmillan Co. of Canada, Toronto, 1934.

This book is at once a lesson and an inspiration. It tells the professional life-story of a pioneer in the art of surgery in our country, with sixty full years to his credit. When Dr. Groves started practice in 1871 at Fergus, Ont., there was no hospital nearer than Toronto, no trained nurse in Canada, and no skilled assistants. His operating room was usually the kitchen, and his operating table a kitchen table or a couple of rough boards. Asepsis, as a working principle, was unknown. Yet with this meagre equipment and discouraging environment Dr. Groves did wonders. At a time (1871) when the abdomen was hardly ever opened he removed a diseased appendix, for the first time on this continent, and probably for the first time in any country. His patient lived! In 1874 he did his first ovariotomy for the removal of a cystic tumour. He had never seen an abdominal operation, nor had any of his colleagues. A growth, weighing more than sixty pounds, was removed. There was no pus formation. His patient lived! Probably the reason was that even at that early date, surgically speaking, Dr. Groves recognized the virtues of asepsis. He boiled his instruments and everything else that came in contact with the wound, and he scrubbed his hands. His success was sure and immediate. One can hardly hesitate to place Dr. Groves high up in the hierarchy of Master Surgeons. Everywhere in his book we find proof of his keen powers of observation, his logical mind, and his practical commonsense. We may not now endorse all his views, notably in regard to tobacco and cancer, but his opinions are always entitled to respect and will repay consideration. A book to be read.

Atlas Fundus Oculi. William Holland Wilmer, M.D., LL.D., Sc.D., Professor of Ophthalmology, Johns Hopkins University School of Medicine. 100 coloured plates. Price $40.00. Macmillan Co., New York and Toronto, 1934.

Any written review of this beautiful work seems quite inadequate and fails altogether to do it justice. It truly must be seen to be appreciated. One's first impression on opening the book at any one of its hundred full page colour plates is that he has come upon a work of art, and this impression is only confirmed and intensified by further examination. The plates, reproductions of actual paintings by Miss Annette Burgess, depict practically every condition seen in the human fundus, normal and pathological, and are wonderfully true in detail and colour. The introduction of the case history on the page facing the plate of each pathological fundus at once gives the personal tone and greatly adds to the clinical value.

Any individual or group, specialist or general practitioner, into whose possession this work may come, or to whom it may be available, must be considered highly fortunate.

External Diseases of the Eye. Donald T. Atkinson, M.D., Consulting Ophthalmologist, Santa Rosa Infirmary, San Antonio, Texas. 704 pages, illustrated. Price $7.50. Lea & Febiger, Phila., 1934.

This work on External Diseases of the Eye and the region thereabout is of the text-book variety. Why its title should be what it is, when nearly one-quarter of the volume is given to the consideration of intra-ocular disease, is for the author to explain. Being put together by one who sees much sub-tropical practice, it contains a fuller description of conditions seen in leprosy, yaws, pellagra, and some fungus and animal parasitic diseases, than is found in most works of this type and size. Taken as a whole, it perhaps has its place, but practically everything in it can be found in the texts we already have; and, generally, better done.

There are a great many excellent photographic copies from life, indeed, more than one expects to find in such a book. There are also many pictures taken from wax models (these, the author's own work); the wax models may be very perfect, but some of the pictorial copies are atrocious, (we have seldom seen a good photographic reproduction of a wax model; perhaps it would be well not to attempt it).

The descriptions are generally up to a fair standard, but there are many instances of loose writing or review, and some careless drawing of diagrams. For example, the author writes in the text that the incision for the treatment of chalazion should be a vertical one, but in his diagram it is made parallel to the lid-edge (horizontal); also, that in slitting the canaliculus into the lachrymal sac, the handle of the bead-pointed knife should not be raised to the vertical position, until the point is felt "to touch the nasal bone", yet he draws it with the handle raised, and the point just inside the punctum. On page 564 he writes, "It is a ludicrous fact that by careless or near-sighted surgeons the Von Graefe knife has been thrust through the cornea upside down". Surely "ludicrous" is a strange word to apply to such an unfortunate error. A near-sighted surgeon would hardly do this unless he were exceedingly careless as well; indeed, he is the very man who would be least likely to do it, other things being equal. But, worse still, on page 566, in a drawing to show the correct line of section of the cornea in the cataract-operation, the knife is distinctly upside down, (compare the drawing on page 584).

Many pages are given to the descriptions of surgical procedures in the eye-region, including the operations

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for cataract and for glaucoma. The details are often far too meagre to make the description worth while. Also, one can hardly agree with his statement that for the relief of glaucoma, the operation done to get a "cystoid cicatrix, has at the present time been generally abandoned". What shall we say of the present popularity in many centres of iridencleisis? There are many other statements which are very near the thin edge of error, or at any rate are not generally agreed to. Therefore, the work needs very careful revision if it is to find its place among the many excellent works already extant covering the same ground.

The Treatment of Injuries of the Head and Spine. Jewett V. Reed, M.D., Indianapolis. 96 pages, illustrated. Price $1.00. C. E. Pauley & Co., Indianapolis, 1934.

This is referred to in the Introduction as "a message from one crossroad surgeon to another", the author having in mind the number of accidents that occur on our highways and the frequency with which severe injuries to the brain and spinal cord occur. There is a full realization of the difficulty of these cases, not the least being the importunity of relations and friends to be "up and doing", when actually the best course to pursue is that of "watchful waiting". "One should never attempt an operation of any kind on a patient with an acute head injury while he is in a state of shock". But Dr. Reed allows a certain amount of guidance from the family. He says, with respect to an ice cap to the head, "I use it whenever one of the family calls attention to my omission"!

It is a clearly written, well illustrated booklet and should be of considerable value to the general practitioner.

Green's Manual of Pathology. H. W. C. Vines, M.A., M.D., Pathologist to Charing Cross Hospital, London. Fifteenth edition, 928 pages, illustrated. Price $8.25. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1934.

This book is an old friend in new clothing. Green's Manual of Pathology is one of those volumes which has gone through many editions, and the new editions have from time to time made their bow to the public under new management. The book still retains many of the characters which recommended it to the student and practitioner at the beginning of the century. It, however, also carries with it some of the shortcomings which have been commented upon in the earlier works. Much improvement could be made in some of the illustrations, and the discussions on bacteria and other parasites could be deleted or presented in a much briefer form. On the other hand, the book gives an accurate portrayal of the principles of pathology, and gives the practical application of these principles in a survey of the important lesions in different organs. It is perhaps better adapted for the student than the practitioner, but the latter, who desires to have a ready reference for the pathology of the commoner diseases, will find it a very useful book.

Practical Obstetrics. P. Brooke Bland, M.D., Professor of Obstetrics and Thaddeus L. Montgomery, M.D., Associate in Obstetrics, Jefferson Medical College. Second edition, 730 pp., illustrated. Price, $8.00. F. A. Davis Co., Philadelphia, 1934.

This second edition of a well known work is an improvement on a good first edition. It bears evidence of most painstaking revision, designed to bring it thoroughly up to date. Modern concepts of the physiology of reproduction, and the new biological methods of the diagnosis of pregnancy are set forth in clear language, aided by illustrations that really illustrate. Emphasis has rightly been placed on the preventive aspect of modern obstetrics; thus the importance of prenatal supervision and the value of external abdominal examination as a means of following the course of labour are stressed. The format of the book is pleasing and there are several fine coloured plates. To the student this work is recommended as a well-arranged presentation of modern obstetrics, and to the practitioner as a statement of the tried and proved procedures adopted at one of the oldest and most celebrated obstetric centres on this continent.

Physical Diagnosis. Richard C. Cabot, M.D., Professor of Clinical Medicine Emeritus, Harvard University. Eleventh edition, 540 pages, illustrated. Price $5.00. William Wood, Baltimore, 1934.

There is no question at all of this being a new edition. It has been brightened up in its general format, and, much more important, it includes much new material. For, of course, a great deal has happened in medicine in the last four years in heart disease, in diseases of the lungs, and in many other directions. The book is to be recommended to students and practitioners alike.

The Autonomic Nervous System. Albert Kuntz, Ph.D., M.D., Professor of Micro-anatomy, St. Louis University School of Medicine. Second edition, 697 pages, illustrated. Price $7.50. Lea & Febiger, Phila., 1934.

In this volume is given a very comprehensive and detailed review of our present knowledge of the autonomic nervous system. A large portion of the book is devoted to anatomical considerations, in which the innervation of all the various systems in the body is described. As is to be expected from Prof. Kuntz, much of the description is histological in nature, but this is essential to a complete understanding, and the excellence of its presentation is a credit to the author. A chapter on visceral sensitivity and referred pain is elaborately detailed. To round out the work and enhance its value from a clinical standpoint there are chapters on the surgery of the autonomic nervous system and the system in disease.

Throughout the book conclusions drawn from clinical observations and experimental endeavour up to the present year, by innumerable authorities in all countries, are set forth. To the research worker, especially as there is a very complete bibliography, this review is most valuable, but as many of the findings are inconclusive and others contradictory it will be rather confusing to the general clinician. By virtue of the fact that knowledge of this subject is changing practically overnight positive conclusions are difficult and dogmatic statements impossible, but it is hoped that in future editions more confirmed data and their practical application will be forthcoming.

Clinical Miscellany. The Mary Imogene Bassett Hospital, Cooperstown, New York. Volume 1, 206 pages, illustrated. Price $3.00. Charles C. Thomas Springfield, Ill. and Baltimore, Md., 1934.

This attractive little volume is an ingenious presentation of several of the less common clinical entities. No doubt all readers of medical texts have felt the difficulty of assembling published case reports relating to different diseases. For example, a practitioner may have a puzzling case, the like of which he has not previously encountered. He consults several text-books in which he may find descriptions of the less common diseases, any one of which may have points in common with the disease that he has just been called upon to treat, but he is baffled for a diagnosis. In this respect it has always been a mystery why the profession of medicine has not evolved a system of carefully prepared case reports to replace some of the dusty volumes of our medical libraries. A good law library is assessed largely on its content of case reports. In preparing his briefs the lawyer builds up a case largely on precedents that have been threshed out time and again in different ways in different courts. It would seem that there is a splendid field for medical collaborators in the larger clinics to build up a system of compilation for the pub-

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A bandaged leg with Varicose Ulcer.

Method of bandaging of ulcers.

lication of interesting and well studied cases, giving in detail the course, treatment and outcome, together with the clinical and laboratory findings. In fatal cases, autopsy findings and in recovered cases follow-up findings would be essential.

The contributors of Clinical Miscellany are to be congratulated in their undertaking to fill a long-felt want. Dr. G. M. MacKenzie, who writes the preface, may be assured that the volume will have readers who find therein "something which, by contrast or confirmation, animates their experience to more fruitful functioning". The volume consists of 32 chapters devoted to as many interesting clinical entities and each of these entities is "brought forward",—as one says of a portrait,—by word pictures in the form of carefully edited case reports, embellished by excellent illustrations. The coloured plates illustrating the skin lesions of meningococcæmia and *S. aureus* bacteriæmia are particularly commendable. Charts, x-ray films, and photographs of pathological specimens contribute to the value of the book for those who are "visualists" and, colloquially as well as traditionally, of Missourian predilections. Moreover, each chapter has its subscription of suitable references to other authors. One would like to mention in this review each of the 22 topics presented, but considerations of space forbid.

The publishers deserve worthy mention for having made an attractive and readable volume at a very reasonable price. Volume 2 will be welcome when it comes.

Psychopathology, a Survey of Modern Approaches. J. Ernest Nicole, L.M.S.S.A., D.P.M.R.C.P. & S., Senior Assistant Medical Officer, Lancashire County Mental Hospital. Second edition, 283 pages. Price $4.15. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1934.

In the first edition of Psychopathology, Dr. Nicole had given us a complete survey of the main approaches to the psychological problems of mental disorders. The conceptions and views of the different schools of psychological thought were discussed and compared, and the researches of these leaders in psychopathology were condensed into this one volume for the benefit of all students of psychology and mental diseases. That a need existed for such a volume was shown by its reception, and, in order that the results of more recent research may be incorporated and appreciation given to lines of thought other than strictly medical, the author has published this second edition. This volume retains all the merits of the first, and the author has added, among other chapters, consideration for the application of psychopathology to our ordinary life, the ways in which psychopathology has been applied to every day life, personal and social. Its influence on law and its administration, on education and child guidance, industry, etc., are discussed under Applied Psychopathology.

To be able to present in such a single volume the theories of Freud, Adler, Jung *et al.*, Berman's endocrine theories, biochemical and physiological approaches and the many other considerations discussed, has required of the author to be concise, and demands of the reader care and concentration in his reading in order that the wish of the author should be satisfied, that this volume may be the starting point of further reading and research.

Tuberculosis in the Child and the Adult. Francis M. Pottenger, A.M., M.D., LL.D., F.A.C.P., Clinical Professor of Medicine, University of Southern California. 611 pages, illustrated. Price $9.50. C. V. Mosby Co., St. Louis; McAinsh & Co., Toronto, 1934.

The reading of this book has been difficult, owing to the style of writing. The opening chapter reminds one of DeKruif's popularizations. It appears to be more like an attempt at selling the anti-tuberculosis campaign than a scientific study of the decline of tuberculosis. The repeated emphasis of the value of the "specialist" is quite irritating. The author admittedly is writing his personal ideas on tuberculosis. This being so, one would be compelled to forgive a number of things. He writes of his immunological conceptions of tuberculosis as if the matter were settled, a definiteness so far totally unwarranted. He is very decided in his opinion that childhood infection protects against adult tuberculosis. Again, this assurance is not justified. The work of the Lyman Hurst School, in the opinion of many, deserves serious consideration. The complete omission of reference to this work is serious, inasmuch as its acceptance would completely reverse the conception of tuberculosis and bring about many practical changes. There are also other omissions.

The chapters on Clinical Tuberculosis are presented in a balanced, sensible way. A great deal of space is given to the "viscero-motor reflex" and its application to clinical tuberculosis, with many references to the work of F. M. Pottenger. The numerous references to the writer and his two sons are a little hard to "down". Also, his chapters on collapse treatment are much too short to be of practical value.

Hormone und innere Sekretion. Fritz Laquer, Professor at Frankfurt University. Second edition, 368 pages. Price, 18 Reichsmarks. Theodor Steinkopff, Dresden and Leipzig, 1934.

In its first edition, this book appeared as a useful little primer of 130 pages with a selected bibliography. In this, the second edition, it has been trebled in size and contains references to almost 6,600 scientific papers! It is, in fact, swamped with references. A little calculation reveals that every twelfth word in the text is an author's name! The reader is accordingly hurried on from fact to fact (strictly speaking, from the claims of one author to the claims of the next, since there is no room for actual experimental findings) with no breathing-spaces for discussion or stock-taking. The author hardly ever offers criticisms of the claims he reports, nor does he in general indicate his stand on controversial questions; good work and bad receive the same brief dismissal, impartially. In many places, valid experimental results are made to appear contradictory, since the author does not allow himself a few words to explain differences in technique or other possible means of reconciliation. Cases of actual misrepresentation of individual authors are not rare, and the picture which the book gives of endocrinology as a welter of conflicting data is decidedly exaggerated. The well-arranged bibliographies, monstrous as they are, are not complete guides to the literature. Illustrations are not provided. Misprints and errors in citation appear to be commendably scarce.

BOOKS RECEIVED

Maternal Mortality in Philadelphia, 1931–1933. Report of Committee on Maternal Welfare, P. F. Williams, M.D., Chairman. 143 pages. Price $1.00. Published by Philadelphia County Medical Society, 1934.

Aids to Psychiatry. W. S. Dawson, M.A., M.D., F.R.C.P., D.P.M., Professor of Psychiatry, University of Sydney. Third edition 318 pages. Price $1.35. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1934.

New Patterns in Sex Teaching. Frances B. Strain. 242 pages. Price $2.00. D. Appleton-Century Co., New York and London, 1934.

The Anatomy of Surgical Approaches. L. C. Kellogg, A.B., M.D., Professor of Anatomy, College of Medical Evangelists, Loma Linda and Los Angeles, Calif. 134 pages. Price $1.50 William Wood, Baltimore, 1934.